# Refrigeration Service Engineer

Vol. 6
No. 4

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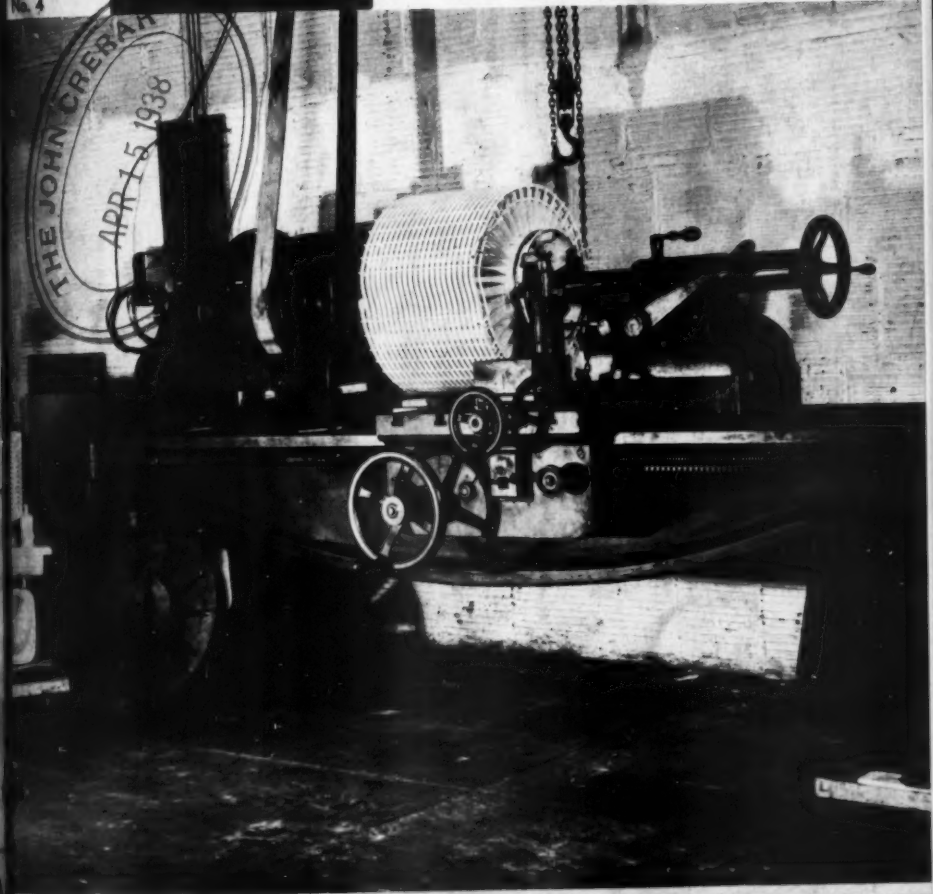

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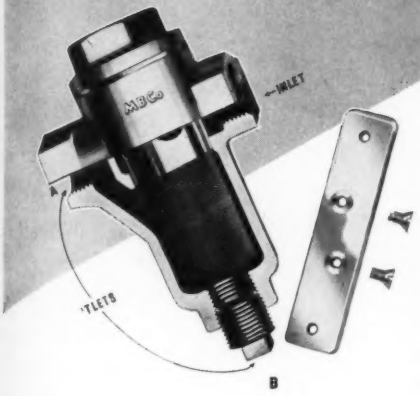
# "TIME TESTED" REFRIGERATION PRODUCTS




● The new Water Strainer may be used for either straight through or angle installations on water or refrigerant lines by plugging out (A) or (B) as desired. Cap and screen are readily removed—easily accessible for cleaning.

This strainer is furnished with steel mounting plate and screws. On copper pipe installations, where rigidity may be required, the mounting plate may be used to fasten strainer to wall or other convenient location. Threaded adapters are used with copper pipe. Mounting plate is not required with rigid, threaded pipe.

## WATER STRAINER

Specifications—Body, Specially Processed Dense Bronze Casting. Screen, 100 Mesh Welded Monel 5¼" Area.

| Catalog No. | Description |
|---|---|
| A-13658 | ⅜" Female Pipe Thread |
| A-13660 | ¼" Female Pipe Thread |

Overall Length 4¼"
Diameter of Body ⅞"

## LIQUID LINE FILTER—

The small refrigerant liquid line filter has the improved cone-shaped strainer screen with a generous 3½ sq. inches of 100 Mesh Monel Screen. The cone strainer is packed with wool to filter fine particles from refrigerant line. It is furnished in the following sizes:

| Catalog No. | Description Inlet | Outlet |
|---|---|---|
| A-13661 | ¼" Male Flare | ¼" Male Flare |
| A-13691 | ⅜" Male Flare | ⅜" Male Flare |
| A-13692 | ¼" Fem. Flare | ¼" Male Flare |
| A-13693 | ⅜" Fem. Flare | ⅜" Male Flare |
| A-13694 | ¼" Male Flare | ¼" Male Flare |

## MUELLER BRASS CO.

PORT HURON, MICHIGAN, U. S. A.

Phosphor bronze disc reinforces top of Sylphon
Swivel button relieves twisting strain from sylphon
Wheel fits palm of hand
Handle swedged and securely locked to bonnet.
Steel nut makes firm, sure seal between bonnet and body.
Short, husky stainless steel stem will not bend. Held open by large bronze spring.
Special spring loaded packing holds gases whether valve is in open, closed or partially open position and prevents pulsations from reaching Sylphon.
Extra large approved bronze Sylphon with soft copper flange to make tight joint under bonnet. Sylphon travel restricted to less than its capacity and extra deep convolutions prolong life to more than 100,000 cycles.
60° seat assures a positive and easy seating action.
All seats protected with lead protectors until used.
Raised portions of base form socket which takes twisting strain when wrench is used on valve.

## Imperial SYLPAK VALVES have proved to be practical answers to the valve problem

OUT of all the operating experience with so-called packless valves and valves with trick packings, has come a definite swing to Imperial Sylpak Valves. This valve, as shown by the accompanying sectional view, offers the double security of the sylphon plus a good spring-loaded packing. The brass forged body is non-porous, strong and uniform and has full size openings.

The Sylpak is a valve that stays tight under *every* operating condition . . . It stands up under pulsations, vibration, excess pressure and can be used with any refrigerant excepting ammonia.

Actual tests, made both in the Imperial engineering laboratory and by the Underwriters Laboratories have shown that these valves will withstand over 100,000 opening and closing operations. And even in the event there should be an occasion to change a sylphon, this can be easily done with the Sylpak while the valve is under pressure.

Despite their special advantages and premium quality, these Imperial Sylpak Valves cost no more than ordinary packless valves. It is no wonder, therefore, that service men in constantly growing numbers are specifying these better designed and better made valves by name when ordering. Imperial Sylpak Valves have shown that they will meet every requirement of present day standards of air conditioning and refrigeration work.

These valves are available for tube diameters from ¼" to ¾" for S. A. E. or solder fittings as desired. Sylphon type valves can also be furnished in sizes up to 1½" female I. P. T. and 1⅝" O. D. tube size.

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# *Imperial Products for*

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## *Refrigerant Filters*

★

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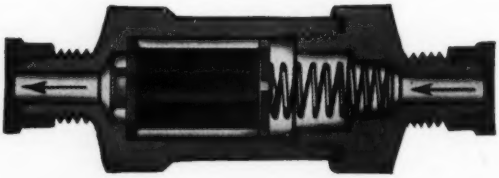
● Zenith filtration gives the finest protection available to liquid control devices. It eliminates service difficulties caused by dirt.

Extreme pressures will not collapse or burst Zenith's all-metallic edge type filter elements. Zenith element design eliminates objections found in fragile and elastic screen and cloth filtering devices.

This drawing of the Zenith Filter Element shows how the fluid passes through the fine interstices that are 2½ times finer than 120 mesh screen.



The filter capacity is determined by the total open area of the element, not by the size of the housing. All Zenith elements are housed to adequately handle the full flow of liquid refrigerant for the recommended installation.

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**ZENITH CARBURETOR COMPANY**
*Subsidiary Bendix Aviation Corp.*
**DETROIT, MICHIGAN**

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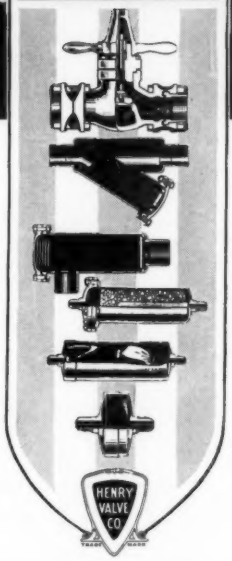
STRAINERS
and DRYERS

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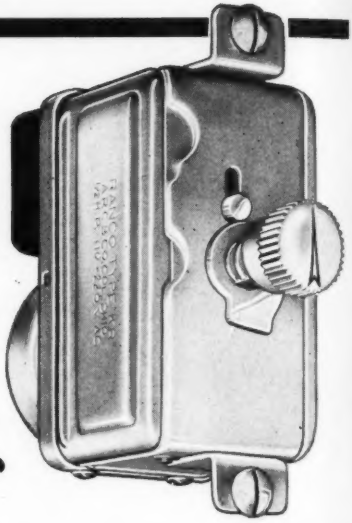

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# The Refrigeration Service Engineer

Vol. 6 No. 4

April, 1938

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

## Cover

This month's cover shows a model D50 G.E. monitor top refrigerating unit set up in the lathe being cut open prior to rebuilding. The photo was taken on the premises of the Flushing Refrigeration Co., Flushing, N. Y.

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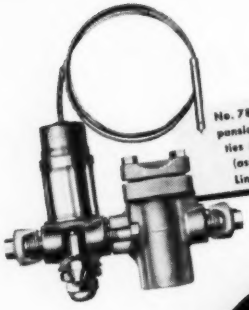

No. 783 Thermostatic Expansion Valve for capacities up to 10 tons Freon (assembled to No. 782 Line Strainer).

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No. 781 Thermostatic Expansion Valve for capacities up to 4½ tons Freon.

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The Refrigeration Service Engineer

Vol. 6, No. 4 CHICAGO, APRIL, 1938 $2.00 Per Annum

## Servicing the

# Mills Ice Cream Freezer

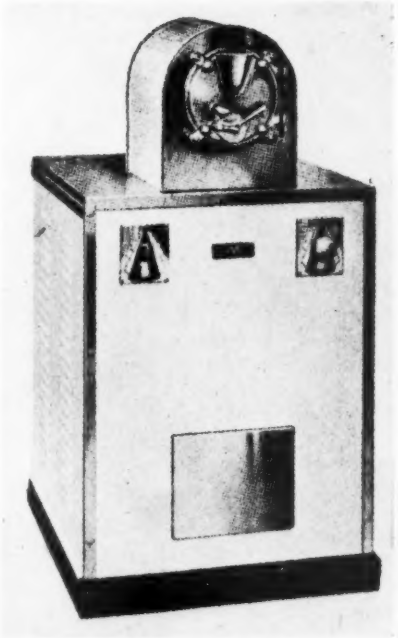
THE Mills ice cream freezer is a universally sold unit, embodying accommodations for one, or all, of the various steps in making and selling ice cream, such as storing of the mix, freezing, hardening and dispensing of the cream.

Placed on the market several years ago, the unit has found a ready market in such places of business as drug stores, confectionery stores, retail dairies, etc.

The essential equipment usually consists of a freezer head and cabinet, in which is contained a machine compartment, if of the self-contained type, or a mix compartment, if of the remote type. Various models contain combinations of additional compartments for the hardening and dispensing of ice cream.

The Mills condensing units, with which these machines are equipped, consist of two sizes—1-hp. and 1½-hp.—and four models of air-cooled or water-cooled type.

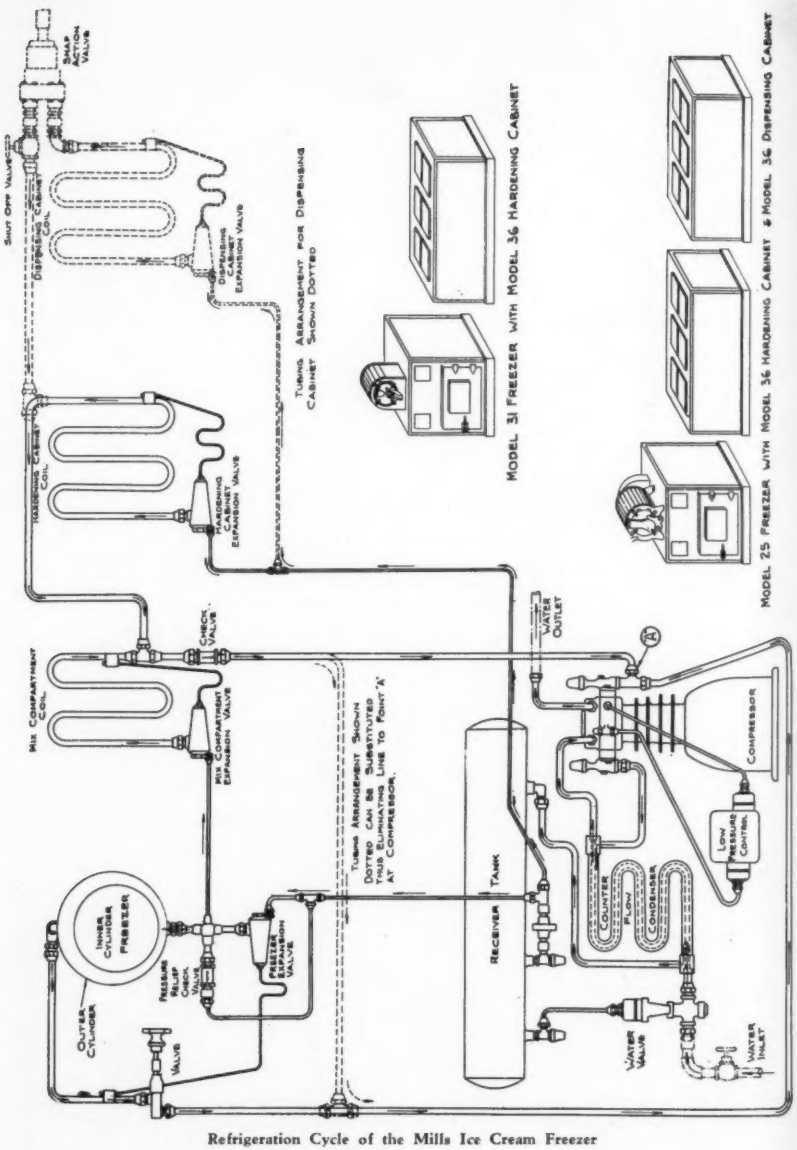
Refrigerant controls throughout are thermostatic expansion valves. With the exception of the freezer head, all evaporators are of the oil filled slab type, using a low grade of paraffine oil as a holdover solution.



Model 32—2½ Gallon Freezer with Self-Contained One Horsepower Condensing Unit

### Cycle of Refrigeration of Mills Units

The freezer cylinder is composed of two cylinders, the smaller of which is slightly


Model 25 Freezer with Model 36 Hardening Cabinet & Model 36 Dispensing Cabinet
Model 31 Freezer with Model 36 Hardening Cabinet
Tubing Arrangement for Dispensing Cabinet Shown Dotted
Shut Off Valves
Snap Action Valve
Dispensing Coil
Dispensing Cabinet Expansion Valve
Hardening Coil
Hardening Cabinet Expansion Valve
Mix Compartment Coil
Mix Compartment Expansion Valve
Check Valve
Water Outlet
Tubing Arrangement Shown Dotted Can Be Substituted Thus Eliminating Line to Point "A" at Compressor.
Compressor
Low Pressure Control
Receiver Tank
Counter Flow Condenser
Water Valve
Water Inlet
Inner Cylinder Freezer
Outer Cylinder
Freezing Relief Check Valve
Freezer Expansion Valve
Drain Valve

Refrigeration Cycle of the Mills Ice Cream Freezer

longer and about 4 inches lesser in diameter, and it is placed eccentrically within the larger cylinder to form a greater space on the top. The ends of the larger cylinder are silver-soldered, forming a sealed chamber into which the liquid refrigerant is introduced at the bottom by means of a thermostatic expansion valve. The greater space at

the top of the cylinder allows active boiling and more complete evaporation of the refrigerant.

The suction line is connected to the top of the cylinder and the vaporized refrigerant is drawn to the compressor through the freezer shut-off valve. The liquid supply line for the mix compartment, in the case of the Models 25 and 31 Freezers, and for the hardening cabinet in the case of the self-contained models, is connected at the bottom of the freezer cylinder at a point immediately above the expansion valve.

### With Freezer Cylinder Shut Off

When the freezer cylinder is not in use and the control valve is in off position, practically all the liquid refrigerant and oil is drained from the freezer cylinder and returned to the compressor through the hardening cabinet refrigerating coils. When the refrigerant is nearly all removed, the pressure in the freezer cylinder will be reduced to a point at which the freezer expansion valve will open and admit more refrigerant. The hardening cabinet or mix compartment expansion valve is then being supplied with refrigerant through the freezer expansion valve. However, the pressure at which the freezer expansion valve operates is sufficiently high so that in normal use no frost accumulates on this valve.

The hardening cabinet suction line incorporates a check valve with the direction of flow toward the compressor and when the freezer cylinder is in use the increased pressure on the low side causes this check valve to remain closed and will not permit the heat-laden vapor from the cylinder to enter the cold hardening cabinet coils. When the freezing operation is complete, the suction pressure will be lowered which allows the check valve to open, permitting the hardening cabinet to function as normally.

To prevent damage to the freezer cylinder or expansion valve, or to control the pressure which may exist in the freezer cylinder in the event that it be sterilized with live steam or extremely hot water, a similar check valve is connected to the bottom of the freezer cylinder supply line immediately above the expansion valve and directly opposite the hardening or mix compartment liquid supply line. The other end of this check valve is connected into the high side of the system either at the compressor head or the liquid line and the direction of flow of this valve is towards the high side of the system.

When this valve is so connected, it forms an automatic relief device and if at any time the pressure in the freezer cylinder exceeds that which exists on the high side of the system, the check valve will open and allow the pressure to equalize. However, in normal operation, the high side pressure causes this valve to remain closed and it performs its function silently, automatically, and requires no attention or resetting.

### Installation of Self-Contained Units

Learning to avoid trouble is just as important as knowing how to overcome it. The success of your work and of yourself depends upon correctness of an installation. A very large percentage of the service calls made are necessitated by improper installations.

Models 26, 27, 30, and 32 are self-contained units and require only electrical and plumbing connections. However, where it is necessary to remove any of these units, the installation procedure outlined for the Models 25, 31 and 36, must be followed.

Compressor valves are in "closed" position when leaving the factory. Compressor belts have been removed and must not be replaced until electrical connections to the motors are installed and tested, and water supply and drain lines are completely connected to the equipment.

It is very important that the ice cream freezer and cabinet rest evenly on the floor. If necessary, shim up the cabinet to compensate for any unevenness of the flooring. This being accomplished will insure against the development of any vibration.

We have outlined a procedure to assist you in making a proper installation:

1. Be certain that the voltage, cycle, and phase correspond to that of the name plate on the motors. Check with customer's electrician and see that all electrical connections are securely made, properly fused and in accordance with state and local requirements governing same.

2. Check belt tension and oil motors.

3. With the compressor-motor switch off, open the discharge and suction service valves and install gauges. Open the liquid line valve at the receiver sufficiently to permit unit to build up a pressure of approximately 25 pounds on the low side of the system, then test all the refrigerant connections with the leak detector torch.

The expansion valves have been adjusted at the factory to give maximum efficiency. If, however, adjustment is necessary, the

hardening cabinet valve should be adjusted to frost out slightly on the suction line when the cabinet is down to temperature. The freezer expansion valve should always be adjusted to frost about one foot out of the freezing cylinder or nearly up to the freezer shut-off valve.

The water valve has been adjusted to maintain an approximate 105-pound head pressure. It may be necessary to vary this adjustment to conform with variation of water supply temperature throughout the country.

4. Units will require several hours operation before the ice cream cabinet reaches the desired temperature of about 15 degrees below zero. The automatic control has been adjusted at the factory to maintain this temperature. If, for any reason, it is necessary to reset the control, refer to the instruction notice pasted on the inside cover of the control box. Factory adjustment for self-contained units is cut-in "O"—cut-out 17 inches. Remote installations cut in at "O" and cut out at 18 inches.

We suggest that the time required for cabinet temperature to lower be utilized to instruct the customer in the care and operation of the equipment.

### Installation of Remote Models

Models 25, 31 and 36 are of the remote-type installation. Installation of the freezer and cabinets requires the same attention as do the preceding models. However, special precaution must be taken in installing a remote model in that the refrigerant lines are exposed to the air while tubing is being flared and connections made. We believe the following procedure of installation to be the best method:

1. Proper location of compressor to be most advantageous to efficient operation. Locate compressor as closely as possible to the freezer and cabinets. Install compressor in basement or room where minimum temperature exceeds the freezing point of water. Obtain a solid support for the condensing unit—preferably a cement foundation. Make certain, if for a basement installation, that the compressor is in no danger of basement flooding during heavy rains.

2. Install refrigerant lines as outlined in the blue print supplied with equipment. It is very important that all refrigerant lines are securely capped shut while the tubing is being installed. Evacuate the system of all air by cracking the liquid line valve at the receiver and also the 5/8 flare nut of the return line at the compressor suction valve.

3. After checking all electrical connections, fuses, switches, etc., with customer's electrician, install the compressor belts.

4. Open discharge and suction service valves and install gauges. Block control switch and allow compressor to pump 25 inches of vacuum. Permit compressor to remain idle for fifteen minutes. If, after this length of time, the compound gauge still registers 25 inches of vacuum, you can be reasonably sure there are no lowside leaks.

5. Test for pressure leaks with leak detector torch as outlined in the installation of self-contained units.

### The Holdover Solution

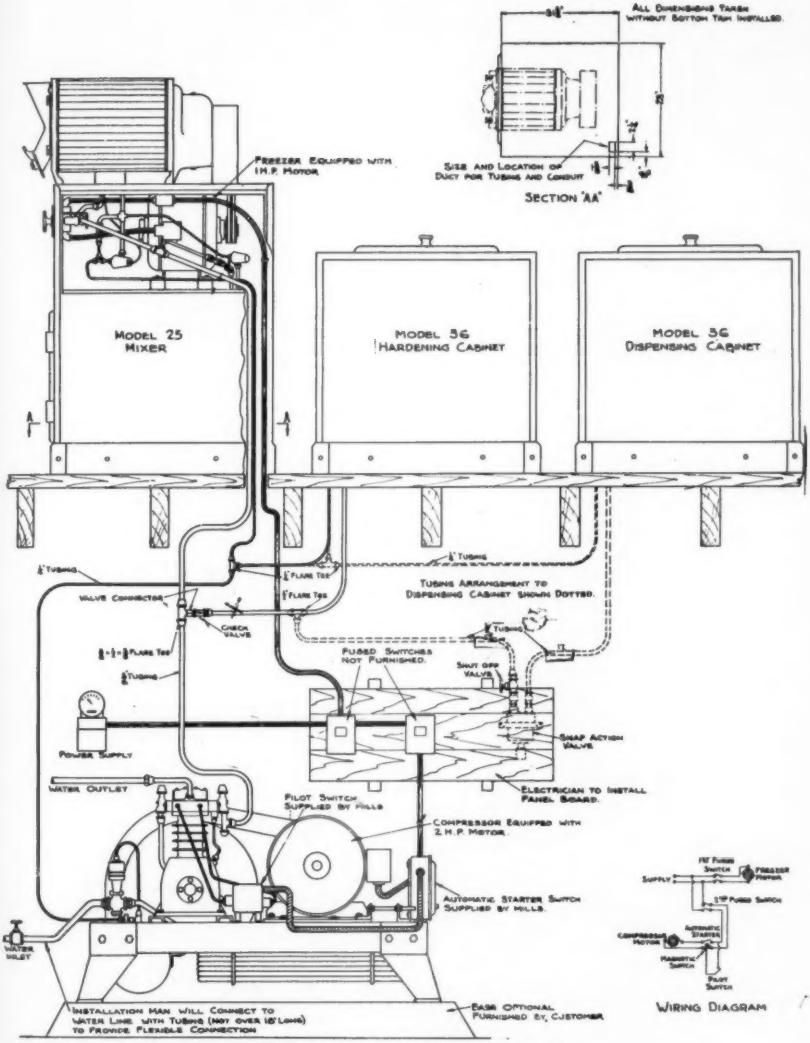
6. The self-contained units contain holdover solution when shipped, but the Model 36 Cabinet requires approximately 27 gallons of this solution. For this purpose we use and recommend a low grade paraffine oil known under various trade names as: Sinclair "Pale Paraffine No. 2"—Standard Oil Company "Straw Flushing Oil"—Shell "Dione." Obtain a hand pump if possible from the company supplying the oil to simplify the filling of the coil slabs.

It may sometimes be required that a portion of the system be maintained at a dispensing temperature. In some cases, in the purchase of a Model 26 or 29 Freezer and a 36 Cabinet in combination, the cabinet portion of the 26 or 29 is to be maintained for dispensing purposes, or the purchaser of a Model 25 and two 36 Cabinets may desire one 36 Cabinet to be used for dispensing. In this case, it is necessary to install a snap action two-temperature valve of a type recommended and supplied by Mills Novelty Co.

The self-contained models, such as the Models 26, 29, and 30, may be purchased with half the cabinet set for dispensing and half for hardening. However, with such an arrangement, the dispensing portion of the cabinet will be suitable for dispensing packaged goods only and absolutely not for dipping ice cream.

The maximum temperature difference obtainable is 12 degrees and the machine is set at the factory to maintain a temperature in the hardening compartment of minus 12 degrees, and zero in the dispensing compartment.

To obtain the two-temperature effect, we short-circuit the last slab in the hardening cabinet by fastening the control tube of the


ALL DIMENSIONS TAKEN WITHOUT BOTTOM TAN INSTALLED.
SIZE AND LOCATION OF DUCT FOR TUBING AND CONDUIT
SECTION "AA"
FREEZER EQUIPPED WITH 1 H.P. MOTOR
MODEL 25 MIXER
MODEL 36 HARDENING CABINET
MODEL 36 DISPENSING CABINET
TUBING ARRANGEMENT TO DISPENSING CABINET SHOWN DOTTED.
FUSED SWITCHES NOT FURNISHED.
SHUT OFF VALVE
SNAP ACTION VALVE
ELECTRICIAN TO INSTALL PANEL BOARD.
COMPRESSOR EQUIPPED WITH 2 H.P. MOTOR
PILOT SWITCH SUPPLIED BY MILLS
AUTOMATIC STARTER SWITCH SUPPLIED BY MILLS.
POWER SUPPLY
WATER OUTLET
WATER VALVE
INSTALLATION MAN WILL CONNECT TO WATER LINE WITH TUBING (NOT OVER 10' LONG) TO PROVIDE FLEXIBLE CONNECTION
BASE OPTIONAL FURNISHED BY CUSTOMER
WIRING DIAGRAM

A Typical Installation of the Mills Ice Cream Freezer

expansion valve where the tubing leaves the middle slab. In this way, the middle slab and the far slab are refrigerated, while the slab nearest the operator merely acts as an elongated suction line and accomplishes no work other than to act as a vapor dryer. This overbalances the temperature in the two sections to the point where ice cream may be hardened in one compartment and packages may be dispensed from the other.

If the customer later desires to change the cabinet back to a standard 40-gallon hardening cabinet, it is necessary only to disconnect the expansion valve control tube and replace it in its well in the last slab as in the conventional models. Then it is only necessary to readjust the expansion valve slightly and refrigerate the entire cabinet.

## THE MILLS TROUBLE FINDER

| DESCRIPTION | POSSIBLE SOURCE | REMEDY |
|---|---|---|
| Ice cream does not freeze fast enough. | Expansion Valve adjusted improperly. | Adjust freezer expansion valve so that return line frosts out of cylinder several inches. Compound gauge pressure should be about 3 to 5 lbs. on a 2 Horsepower Condensing unit and 7 to 10 lbs. for a 1½ Horsepower unit or 1 Horsepower unit. |
| | Shortage of refrigerant. | *Find the leak.* Test amount of refrigerant by opening the Freezer hand valve. If freezing cylinder frosts over completely in less than three minutes time you can be reasonably sure the supply is sufficient. To eliminate the possibility of over-charging the system, pump down unit until all the gas is condensed and stored in the receiver. Purge any air, if present, through purge valve located on top of receiver. Add sufficient refrigerant until head pressure increases slightly. Attach charging line to suction service valve. Place refrigerant drum in a pail of hot water in a vertical position so that the refrigerant enters the unit as a gas. |
| | Compressor or Mixer motor belts slipping. | Check both sets of belts for proper tension. |
| | Temperature of mix too high. Mix not balanced or processed correctly. | Mix temperature should not exceed 38 degrees when entering the freezer. Check with company supplying mix. Compare with our mix specifications. |
| | Compressor inefficient. | Inspect water supply and temperature. Note head pressure. Test compressor for leaking discharge and suction valves. |
| | Restricted filter, dryer or expansion valve strainer. | Remove these devices and clean them if possible or replace. Refill dryer. |
| | Freezer cylinder scraper knives dull or not fitted to scrape walls evenly. | Dress knives with a file. Check for correct alignment of agitator assembly. |
| | Customer freezes ice cream to a too heavy consistency. | Explain to customer that it is unnecessary to freeze ice cream for a longer period than is required as per the Ice Cream Manual instructions. |
| Freezer Noisy. | Freezer Motor pulley loose.<br>Freezer pulley loose. | Tighten pulley set screw.<br>Tighten pulley set screw. |
| | Freezer Chain or belts loose and slipping. | Increase tension. |
| | Gear Housing short of oil. | Fill gear housing with S.A.E. 30 oil to level plug. Capacity—3 pints. |
| | Freezer leg screws loose. | Draw up screws tightly. |
| | Motor and freezer pulleys out of line. | Make proper alignment. |
| | Agitator assembly bent. | Straighten if possible or replace. |
| Compressor Noisy. | Motor pulley loose on shaft. | Tighten set screw. |
| | Copper tubing or water pipes vibrate. | Tape copper tubing securely. Strap water pipes. |
| | Chatter in water lines. | Install water pressure reducing valve. |
| | Compressor belts loose and flapping. | Tighten—Replace if worn. |
| | Condensing unit not resting evenly on support. | Shim up high corner. |
| Water valve does not shut off during off cycle of compressor. | High head pressure resulting from restricted water supply or air in system. | Check source of water supply for restriction and temperature. Purge air from system. (Locate and fix low-side leak.) |
| | Automatic water valve rubber washer worn or seat badly pitted. | Reverse rubber washer. Advisable to replace entire valve if seat is very badly pitted. |
| | Accumulation of sediment in water valve. | Flush out valve thoroughly and install strainer in supply line if sediment collects frequently. |
| | Overcharge of refrigerant. | Remove sufficient refrigerant to restore head pressure to normal. |

## THE MILLS TROUBLE FINDER

| DESCRIPTION | POSSIBLE SOURCE | REMEDY |
|---|---|---|
| Compressor starts and stops frequently. | Expansion valve on hardening cabinet set too lean. | Adjust expansion valve so that return line of hardening cabinet is visible. |
| | Restricted liquid line. | Examine filter, dryer and expansion valve strainers. Clean or replace. |
| | High head pressure control operating motor switch. | Check water supply—air in system—and overcharge of refrigerant. |
| | Compressor discharge or suction valves leaking. | Lap in valves or replace. |
| | Low pressure control not adjusted correctly. | Reset control. Average setting: cut in 0 lbs., cut out 17 inches. |
| | Low pressure control set at too low a vacuum. | Cut out point recommended is 17 inches. |
| | Compressor belts slipping. | Increase tension. |
| | Compressor valves leaking. | Lap in valves or replace. |
| | Shortage of refrigerant. | Add refrigerant— |
| | Customer using hardening cabinet to dispense ice cream. | Hardening cabinet cannot be used successfully as a dispensing cabinet when used as a hardening cabinet. Secure a dispensing cabinet. |
| | Heavy accumulation of frost on cooling slabs. | Instruct customer to defrost slabs periodically. Remove frost with a stiff brush or a non-metallic scraper. Caution him not to use ice picks or anything that may puncture the slabs. Never defrost by melting down the cabinet. |
| Ice Cream does not harden fast enough. | Product in packages packed closely preventing circulation; temperature will rise after large batch of ice cream is placed in cabinet. | Rearrange packages to allow circulation. Temperature will drop after batch has been cooled to cabinet temperature. |
| | Hardening cabinet expansion valve not adjusted correctly. | Adjust expansion valve so that frosting back of return line is visible. |
| | Low pressure control set to cut out too soon. | Reset control to maintain lower temperature. For average conditions 17 inches or 18 inches is sufficient. |
| Suction line of Hardening Cabinet frosts back. Unable to regulate adjusting nut. | Thermostatic bulb of valve out of position or gas charge lost due to leak. | Replace bulb of valve in cabinet well after coating same with vaseline. Necessary to replace power element if gas charge is lost. |
| | Moisture in system causing valve to stick open. | This trouble is dealt with more completely in the following pages. |
| | Foreign particles lodged under needle seat. Expansion valve needle or seat worn. | Turn valve adjustment to right opening needle to flush seat. Replace valve if worn. |
| | Freezer pressure relief check valve not seating permitting refrigerant into cylinder ahead of expansion valve. | Remove check valve and flush out thoroughly to remove any foreign particles from seat. Replace check valve if unable to repair. |
| | Thermostat bulb clamp loose. Clamp broken. | Clean contact points and tighten. Replace clamp or fasten bulb securely to tubing line with friction tape until new clamp can be obtained. |
| Motors stall or overheat. | Customer neglects periodical oiling of motors or uses too light grade of oil. | Motors must be oiled once a month with a medium grade motor oil. |
| | Low voltage. | Notify local power company. |
| | Open circuit, or other trouble that requires extensive repair work. | Notify the Service Department of Mills Novelty Company at once and you will be instructed whether a repair or a replacement is to be made. |

### Moisture in System

Most serious of all service calls, unquestionably, is moisture in the refrigerating system. Serious as it may be, moisture can be isolated from the system and removed without damage to the equipment. All equipment leaving the factory of Mills Novelty Company has been thoroughly dehydrated and no further precautions need be taken to guard against moisture at installation of self-contained units other than a thorough inspection as outlined under installations. When remote installations are made, and the refrigerant lines are exposed to the air for a short time, a dryer is included with the equipment. This dryer is filled with calcium oxide, and is to be installed in the liquid line near the receiver of the condensing unit. This device will absorb any moisture that may have entered the system during the time of installation and should be allowed to remain in the system for approximately one week. *Use only anhydrous calcium oxide to refill dryers and under no circumstances may other drying agents be substituted without the written consent of the Mills Novelty Company.*

If for any reason moisture has entered the system, following is a procedure which, in our opinion, will remedy the most stubborn cases:

A leak at any point in the lowside of the equipment will admit air and one of the indications of trouble will be that the water valve does not shut off during the off-cycle of the compressor. Excessive head pressure will be noted and the hardening cabinet expansion valve may become restricted, or the compressor will short-cycle, due to the high pressure cut-out control.

After installing gauges, purge system of air to restore pressure to normal. Purge valve located on top of liquid receiver will rid system of air without the loss of refrigerant. Shut off compressor motor switch. Allow entire lowside to build up to about 25 pounds pressure. To do this, open freezer hand valve and, if necessary, pour sufficient hot water in the cylinder to raise the low side pressure. Check every connection with a leak detector torch. It would be advisable to check the highside at the same time. Tighten all flare nuts. After leak has been located and it is found necessary to replace a part or reflare a refrigerant line, the system must be pumped down entirely. Proceed by shutting off the liquid line valve at the receiver; open freezer hand valve; turn on compressor motor switch; add hot water to the freezing cylinder until all the remaining refrigerant in the lines has been vaporized.

This method of pumping down the system requires but a few minutes. Allow one pound pressure in the lowside to be present before opening a connection. It is very important that the dryer in the system be refilled with a fresh supply of calcium oxide before putting the equipment back in operation. It will be necessary to install a dryer in the liquid line of a self-contained freezer if there has been a low side leak. Self-contained units when shipped from the factory, do not include dryers but we will ship them to you immediately upon notification.

Assuming that the leak has been satisfactorily repaired and after the equipment is put back in operation, allow compressor to operate a short while and then open the receiver purge valve to be certain that system has not admitted more air at the time of repair.

### Stubborn Cases of Moisture

If hardening cabinet expansion valve continues to indicate the presence of moisture, it may be necessary to install a second dryer. This dryer is to be installed in the liquid line teed off from the connection located immediately above the freezer expansion valve, which supplies the liquid to the hardening cabinet of the self-contained models and to the mix compartment of the Models 25 and 31 Freezers. Moisture, if any, that has collected in the freezing cylinder will be absorbed by this dryer before reaching the cabinet expansion valve.

It is quite possible to have a leak in the lowside of the system that will admit air when the equipment is operating under a vacuum, but will not leak when the system is under a pressure. This leak may occur at the seal of the compressor. To eliminate the possibility of a leak, the following test is to be made:

Install the low side gauge. Turn in valve stem clockwise so as to shut off the suction line. Draw a 25-inch vacuum without pumping over oil by stopping the compressor when it starts to pump oil, and then start up again in a few minutes. Allow to operate until you are sure all gas has been removed from the crank case. Install a high pressure gauge, turn valve stem clockwise until seated, shutting off the condenser; loosen the

gauge until all the pressure has been removed; tighten gauge and operate compressor with a 25-inch vacuum, and if the pressure builds up in the gauge, it is an indication that air is being taken into the system through the low side of the compressor.

If in doubt, release the pressure from the gauge and try it again. If a pressure develops a second time, you can be absolutely sure that a leak is present. It then will be necessary to either repair the seal by lapping it in, or replacing it. In some cases it will be necessary to replace the compressor. The entire low side of the system can also be checked in this manner.

# Lacquer Finish

## Its Care and Repair

*By* L. K. WRIGHT, M.E.

INSTALLATION, service and sales crews should know about the care and repair of lacquer for it is the preponderant finish used on the smaller, cheaper household refrigerators.

Lacquer is a paint-like finish extensively used on automobiles and refrigerators because of its durability. Besides being durable, this material gives a hard, attractive, sanitary finish. With proper care and treatment lacquer retains its fine appearance indefinitely.

To clean and polish lacquer, use only Ivory soap and warm water, or powdered (not cake) Bon Ami and warm water. Remove the soap suds or Bon Ami that will remain on the surface after cleaning with clear water and a cloth free from alkali (soap, kitchen cleaners, etc.). Dry and polish the surface with a clean cloth. Lacquers cleaned in this manner will retain their original attractiveness over a long period of time.

Wax base or oil base polishes and cleaners, such as Duco polish, Simonize and furniture polishes, should not be used on a white refrigerator finish. Continued use on a white lacquer will, in time, cause yellowing. On colored cabinets and automobiles this yellowing effect is not apparent and can be employed if desired.

If the finish has already been oiled or waxed, the film can be removed with naphtha, followed by an Ivory soap or Bon Ami cleaning, as recommended previously. Never employ alcohol as the coating will be softened or stained.

Grease, salad oils and the natural oils or perspiration exuding from the human body are detrimental to all cabinet finishes. Consequently, cabinet doors should be opened and closed by means of the latch handles. Constant abrasion and repeated application of the hands to the finish on a door is undesirable, as it will tend to turn the finish yellow and eventually wear through the lacquer. Use the handle on the door when opening or closing it.

### Touching Up and Refinishing Lacquer

A damaged lacquer surface can be easily retouched or even entirely refinished in the service shop or on a customer's premises. A new cabinet should never be returned to the factory for lacquer damages. It can be reconditioned in the field, quicker and cheaper, by following the appended instructions.

For convenience in denoting and treating damaged lacquer the troubles have been segregated into three groups, as follows:

Class A—small nicks, scratches, pin holes or mars that do not extend through the coating to the base metal.

Class B—small nicks, scratches, pin holes or mars that have extended through the coating and exposed the base metal.

Class C—large blemishes, long scratches, worn or rusted areas, etc., requiring complete refinishing of a panel or the entire cabinet.

### Class A Repairs

1. Thoroughly clean the spot to be touched up, using a clean cloth moistened with naphtha.

   a. This preliminary cleaning is important and is always necessary. The natural oily film always present on the surface must be entirely removed before the lacquer is applied, otherwise proper bonding or adhesion will not take place.

2. After drying cleaned surface, fill in the

scratch, pinhole or nick with a thick white lacquer. This is known as brush lacquer, formulated for this purpose and is much thicker than spray stock. Additional thinner is unnecessary unless lacquer has become thickened from repeated opening of container. Keep lacquer can covered, even if it is to be used again in a few minutes.

a. Use a No. 2 pencil-point brush for all except very large blemishes.

b. Build up the scratch or nick with two or three applications of lacquer so that when dry it is higher than original coat. If the scratch is small or is a pinhole type of damage, drop the lacquer into the hole rather than apply it with the brush.

c. Do not apply lacquer beyond the boundaries of the damaged area, but be sure that new lacquer joins the edge of original finish.

d. See that entire spot is higher than original surface and that the fill does not have little depressions or bubbles. The fill should extend clear over the damaged spot and join the old lacquer. Beginners usually build a high center and leave a depressed rim where it joins the old lacquer, whereas the repair spot should be a level surface.

e. Allow at least 15 minutes between successive coats of lacquer.

f. Allow the completed fill to dry for an hour, at least—longer, if possible. In shops try to let dry over night.

3. Using 8/0 wet-or-dry carborundum paper, thoroughly wetted with water or naphtha, scuff or sand lightly until the retouched spot is dressed down to a smooth finish flush with the rest of lacquer.

a. Dress down repair spot and do not cut into old lacquer.

b. In sanding corners, edges or rounded surfaces, use flat of first two fingers, not the tips and exert as little pressure as possible. In sanding flat surfaces, wrap sandpaper around a flat block of wood or use a regular sanding block.

c. Rub in a straight line and in one direction.

d. At frequent intervals, pass bare finger tips over retouched spot to see if sanding is progressing satisfactorily.

e. Slow, careful, gentle sanding is essential. Working too rapidly, or pressing down too hard, may cause sandpaper to cut through finish, ruining previous work.

4. After lacquer has been gently dressed down polish sanded portion vigorously with a soft cloth dipped in water and sprinkled with powdered Bon Ami (not cake). If the refrigerator has been in use for some time and retouched portion appears lighter than rest of finish, go over entire finish with powdered Bon Ami.

5. Finally, go over surface with soft cloth slightly dampened with naphtha. The naphtha will remove Bon Ami left on surface and will complete blending of the edges of old and new lacquer so that retouched spot is invisible. Be sure to have cloth only slightly dampened. Too much naphtha will temporarily resoften lacquer too much.

a. Do not apply Duco, Simonize, or other patented polishes. They will discolor white lacquer over a period of time.

### Class B Repairs

1. Clean and prepare surface for refinishing by scuffing or sanding lightly with 8/0 carborundum paper dipped in naphtha.

a. After old lacquer becomes feather-edged around spot being scuffed and a bright metal surface has been secured, wipe surface clean with a naphtha-dampened cloth. Dry with a lintless cloth, such as cheese cloth.

b. Be sure surface is clean and bright.

2. Using brush most suitable (either No. 2 pencil or a ⅛" Ox-hair brush), apply a thin coat of air drying primer to the bare metal only. If the primer becomes too thick, thin with a few drops of naphtha before applying.

a. Allow to dry over night.

3. Then, if the metal is dented, fill in dent with glazing putty applied with a thin, flexible artist's spatula. Dents cannot be filled in with lacquer.

a. Allow to dry at least two hours, then sand smooth with 8/0 paper moistened with naphtha.

b. Clean surface with a lintless cloth.

4. As instructed under Class A damages, proceed to apply lacquer, allow to dry, gently sand down and polish surface.

### Completely Refinish Cabinet or Touch Up Class C Damage

1. Clean and prepare surface for refinishing in accordance with one of the following procedures (a, b and c). Some prefer to use lacquer thinner and a scraper to hasten removal of old coating.

a. Where surface must be refinished but original prime coat is intact, scuff with 5/0 carborundum paper dipped in naphtha until all film is removed. Wipe

surface clean and dry with lintless cloth.

b. Where old finish has deteriorated and must be removed before refinishing, sand with 150 mesh (heavy) emery cloth or 5/0 (heavy) garnet or flint sandpaper dipped in naphtha until old lacquer is removed. Clean and dry surface.

c. Where rusting has occurred, scrub with medium bristle wire brush until rust is removed, then sand as above. Take care not to gouge or scratch metal with wire brush. Clean and dry surface. Then apply a tissue-thin layer of bond coat to bare metal only, using a small rag for the purpose. Bond coat is applied as a preventive of rerusting. Allow the bond coat to dry over night.

d. Be sure surface is clean.

2. Using flat spray nozzle for large areas or pencil point (round) spray nozzle for small areas, spray one coat air-dry primer over all bare metal and allow to dry for 24 to 48 hours.

a. If dents or deep scratches are present in the metal, fill in with glazing putty, as instructed under Class B damage.

b. Very lightly scuff entire surface with 8/0 paper (naphtha is unnecessary here) and clean with lintless cloth.

3. Using flat spray nozzle (or pencil-point nozzle if area is small), adjusted for medium width spray, spray surface evenly with two criss-cross coats of spraying lacquer, allowing one hour between coats.

### Spraying Lacquer

1. Always have plenty of light on surface to be sprayed. Daylight is the best means of illumination. If the room must be lighted electrically use plenty of wattage. Never allow open flames in or near the spray room.

2. Be sure spray is properly adjusted before pointing gun at a cabinet. Practice on an old cabinet or a discarded panel and make sure spray is regulated.

3. With portable, low pressure spraying equipment, hold gun about 10 inches from surface. If held too close, lacquer will run before drying. If held too far away, lacquer will dry before reaching surface, giving a dusty, satin finish that will not adhere, or at best produce a pebbled surface.

4. Handle gun as though the spray were a brush being drawn across the surface. When spotting, work gun trigger in spurts. When going over entire surface, move spray with long, even strokes, preferably releasing trigger at the end of each stroke or on the back stroke.

5. Use throttling screw to regulate amount and width of spray. Each gun is provided with some means of adjustment. A medium or medium-narrow spray will usually be found best. For spray-coating small areas or for applying a thin coat of lacquer, the throttle may be cut down considerably.

6. Do not keep gun pointed at surface after the trigger is released, for if it is of the type which continually permits escape of air the blast from the nozzle may ripple the newly sprayed surface.

7. To apply criss-cross coats, set slot of flat nozzle first vertical, then horizontal.

8. If the gun is set aside for a few minutes, lacquer on the lips of the nozzle will dry. Before using gun again, remove this old lacquer by drawing finger nail or edge of paper or cardboard through slot or from nozzle nose. The nozzle must be kept clean and clear of tacky or hardened lacquer.

9. Each manufacturer issues instructions as to the manner of cleaning equipment. Follow directions explicitly, for a dirty gun, with nozzle or spray tube choked, is valueless for good work.

10. When spraying entire cabinet place cabinet on a raised platform, with wooden blocks raising the cabinet from the floor of the platform. This permits spray reaching the curve of the baseboard. If the cabinet is placed flat on the floor an unfinished line will result at the base. Remove the door and throat lining strips and block in door opening with large piece of cardboard to prevent lacquer from entering interior. Shield wood frame around door opening with pieces of paper, cardboard or gummed masking tape.

### Spraying Door

11. When spraying door, remove from cabinet. Also remove hardware and shield door gasket by slipping strips of cardboard between gasket and door. If gasket is of the removable type remove and spray without cardboard blank. If gasketing is worn, remove and spray door, replacing gasketing with new stock when door is dry. The gasket must be resilient and without signs of wear, otherwise it is liable to permit air leakage. If the edges and corners are slighted when spraying rest of door with flat spray nozzle, they can be easily reinforced by using pencil-point or round spray nozzle afterwards.

12. When spraying top, hang it up on a

peg or nail, if top happens to be removable. Use round spray nozzle on edges and corners afterwards, if necessary. With a little experience, this will be unnecessary.

13. If gloss of newly sprayed finish is not uniform (that is, part has a glossy appearance and part has a satin or dusty appearance—caused by holding the gun at different distances from the surface—spray a very thin coat of lacquer reducer over entire finished surface. Be sure to throttle gun when spraying reducer until just a damp surface is secured. This touch up job will not occur after some experience is had in the regulation of the gun in holding it at a uniform distance from the work.

14. After refinishing a cabinet, whether touched up with a brush or sprayed, allow lacquer to dry over night, at least, in order to permit lacquer fumes to disappear completely and permit lacquer to harden.

15. Shelves and trays, if tinned or galvanized, can be sent out and redipped for but little cost. This gives them a brand new appearance.

16. If hardware is worn; that is, hinge pin worn, causing door to settle or if the plating has worn off, replace with new hardware. If the hardware is provided with wearing washers, replace washers and have latch and hinges, together with all the screws, replated. If the hardware is in good condition polish with Bon Ami and oil, using tooth brushes for little corners or depressions. Replating and polishing should be resorted to for best appearance.

### Materials for Refinishing

The following materials are those necessary for the shop which is to take care of average touch-up and refinishing jobs.

1—No. 2 Pencil Brush
1—1/8" Ox-Hair Brush
1—1/2" Flexible Artist's Spatula
1—Can Refrigerator Air Drying Primer
1—Can Naphtha
1—Can Refrigerator Glazing Putty
1—Can White Brushing Lacquer
1—Can Lacquer Reducer
1—Can Bond Coat
12—1/6 Sheets No. 400 Emery Paper, Dry-Wet Type
12—1/6 Sheets 8/0 Sandpaper, Dry-Wet Type
12—1/6 Sheets 150 Mesh, Heavy Emery Cloth, Dry-Wet Type
12—1/6 Sheets 5/0, Heavy, Garnet or Flint Sandpaper, Wet-Dry Type
1—Felt Sanding Block
1—Can Powdered Bon Ami
1—Bundle Cheesecloth
1—Portable, Spraying Outfit, complete with compressor, 1/4 h.p. motor, cooler, tank, automatic cut-in and cut-out, oil interceptor, spray gun, reservoir and hose.
1—Can White Spraying Lacquer
1—Can Air-Dry Primer, for spraying
1—Wire Brush, medium bristle
1—Roll Masking Tape

### Use of Glycerine

Lacquers, as well as oil-base paints and enamels, will neither combine with nor penetrate a film of glycerine. Many users of spray apparatus are turning to this material and eliminating shields or masking tape in certain places.

The glycerine is easily removed after the spray coat has dried by merely sponging with water. As glycerine is neutral it will neither react with painted surfaces or raw metal. When applied to an existing painted, enameled or lacquered surface no damage will be done, instead a sheen will actually be imparted to the finish. It is advisable to thoroughly wash off the glycerine as this liquid will tend to gather and hold dust and dirt. If left, subsequent washings by the householder will remove it.

S S S

## REFRIGERATION SERVICE KINK

WHEN it comes to twisting "slippery round things" as the service engineer often must, the accompanying sketch shows how easy it is to make a good wrench out of a leather strap and a pair of pliers. Wrap the strap around the article to be turned, as shown, and grasp close to the article with the pliers.

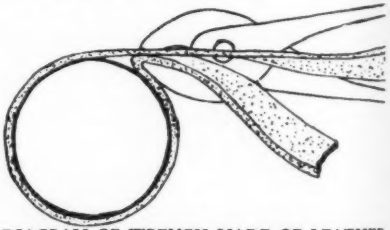


DIAGRAM OF WRENCH MADE OF LEATHER STRAP AND PAIR OF PLIERS

If it is desired to tighten a thread turn clockwise as in the sketch. If the thread is to be loosened, simply pull the other way just as with any regular wrench. This idea is of especial value on brass or copper pipe which may be marred with a pipe wrench. The leather forms a cushion between the pliers and the metal.

If it is thought that a single thickness of leather will not be strong enough it is a simple matter to use two thicknesses or more. Thus the method really has no size limit, provided one has a strap that is long enough. What is more, the strap needn't be leather. Any strong, flexible material will do—even rope.

*Tenth Article*

# Air Conditioning

## Servicing the Model 50F

*By* W. C. FARMINGDALE

LIKE any other electrical appliance, the Model 50F Room Conditioner needs minor adjustments and service from time to time. Since in most locations the cooling equipment of the room conditioner will be used only in the months from May to October, the unit should be pumped down and shut off during the idle months. If a careful check up is made on the unit before it is set in operation the following season, customer satisfaction is assured.

Since winter months are generally slow in the service departments of air conditioning companies, it is advisable to check units at the pump down time and where necessary, sell the customer repairs on his unit at this time. This serves two purposes:—(1) It keeps the shop busy in slow times, and (2) it eliminates the rush at start-up time and so prevents careless, hurried-up work.

### Checking the System Before Preparing It for Winter Service

Before shutting down a job for the winter, install both high and low side gauges and allow the unit to run for about 15 minutes. Then check the following items:

1. Sufficient refrigerant
2. All joints for leaks
3. Sufficient oil
4. Discharge valves
5. Suction valves
6. Brushes on d.c. fan and compressor motors
7. Belt tension
8. Seal
9. Filter
10. Primary air fan
11. Expansion valve and liquid line strainers
12. Fins of condenser for dirt

*1. Checking for Refrigerant:* A positive means of determining whether or not the unit has sufficient refrigerant is built into the Model 50F. When the system is completely pumped down and the liquid level test cock is opened, liquid, *not gas,* should pour out of the test cock.

To test for refrigerant level, run the liquid line shut-off valve (on top of the unit near the expansion valve) all the way in and allow the machine to operate until the back pressure remains constant at about five pounds pressure. Then shut off the switch and open the liquid level test cock (see Fig. 1). If liquid pours out, the system has sufficient refrigerant.

*(A) Adding Gas:* If the system is short of refrigerant there must be a leak in the system. In order to tell how bad the leak is, you must know how much refrigerant has been lost, and in order to do this you must add gas to the system to bring the refrigerant level back to normal.

To add refrigerant to the system install a gauge and a tee in a quarter-inch line and attach the refrigerant drum to the suction side of the compressor. Be sure the job is pumped down before starting to add gas.

Start the compressor, open the drum valve and add gas in the conventional manner. While adding gas, keep opening the liquid level test cock so that you don't overcharge the system. In case the pressure goes down quickly in the drum, close off the drum valve and then crack it. Now invert the drum and meter liquid into the compressor. Keep the drum valve cracked so that the compressor does not pound.

*NOTE:* Refrigerant can be added to the Model 50F in the "raw" state because of three things—(1) The compressor uses truncated pistons, (2) there is considerable clearance between the top of the piston and the bottom of the discharge valve plate, (3) the openings in the discharge valves are very large.

The truncated piston does not permit the refrigerant gas to contact the oil in the crankcase and this prevents oil slugging when raw gas enters the suction port. Then too, because of the relatively large clearance between the top of the piston and the bottom of the discharge valve plate, raw gas will not liquefy sufficiently to cause a hydraulic pressure between the piston and dis-

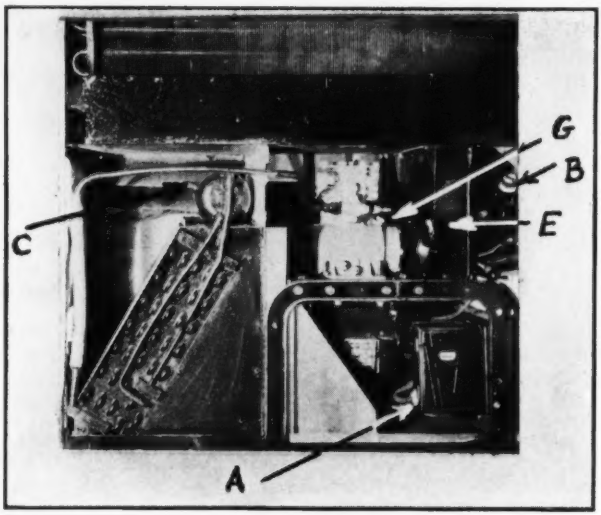



FIG. 1—FRONT VIEW OF A D.C. MODEL 50F

A—D.C. starting box (only used on D.C. models)
B—Fusetron on D.C. fan motor
C—Liquid level test cock on receiver
E—Primary air fan
G—Oil filler plug on crankcase

charge valve as would happen on conventional compressor designs. In fact, on a test run liquid was added to the low side of the system without causing any hammering in the compressor body.

While adding refrigerant keep cracking the liquid level test cock. As soon as liquid (not gas) pours out of the test cock, close off the drum valve, pump down the charging line to zero pounds, stop the machine and remove the charging line.

When the job is completely charged, you can estimate how much refrigerant leaked out. If you had to add several pounds of gas, you'll know that there's a sizeable leak on the job that must be found. On the other hand, if only a quarter pound of gas had to be added, the leak may be due entirely to seepage and may be so small that it can't be found.

2. *Testing for Leaks:* Experience on the Model 50F shows that bad leaks develop at the following parts:

1. Seal
2. Compressor service valve gaskets
3. Compressor bottom plate gaskets
4. Expansion valve bodies

In testing the system every joint (both flare and gasket) should be tested with a Halide leak detector. However, extreme care should be taken at the four points enumerated above.

The cap screws which hold the service valves and base plates should be tried with a wrench to make certain that they are up snug.

The service valve flanges and the base plate should be examined with a strong flashlight for telltale signs of oil.

There is a small shelf under the seal which tends to catch any oil that might leak out of the seal and so prevents the oil from getting on the belts and causing them to deteriorate. This should be examined for any signs of oil. If oil is on this shelf, the seal must be leaking. Experience shows that it is better policy to replace the seal rather than attempt to lap it in on the job. The original seal on this job is the type which seals against the shaft shoulder. The replacement seal is the later type which has an independent seal nose that is slipped onto the shaft. Then a bellows-type seal butts up against the seal nose.

Occasionally, the expansion valve on a Model 50F leaks around the Bakelite body of the valve or at the liquid line connection to the valve. Accordingly, these two points should be tested carefully with a Halide torch. If the valve leaks at the body, the valve must be replaced. If the valve leaks at the liquid line connection, a new strainer and gasket will sometimes fix the leak. (The inlet connection to the valve uses the strainer as a seat for the flare on the tubing. Hence, if this seat is damaged or if the copper gasket between the strainer and the valve body is misplaced, a leak will develop.)

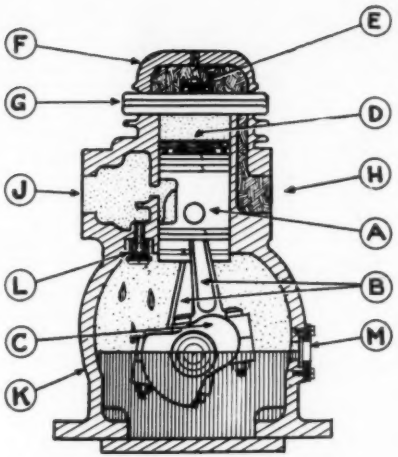



FIG. 2—A COMPRESSOR SIMILAR TO THAT USED ON THE 50F. Note that the oil return device is the only connection between the crankcase and the suction port. Suction gas does not pass over the oil in the crankcase

A—Truncated piston
B—Connecting rods
C—Counter balanced crankshaft
D—Piston valves
E—Discharge valves
F—Compressor head
G—Discharge valve plate
H—Discharge port
J—Suction port
K—Crankcase
L—Oil return device
M—Sight glass (not used on 50F)

On one job a sizeable leak was found in the flexible tubing which connects the compressor head port to the condenser. The leak was eliminated by resweating the connection.

*3. Checking the Oil Level:* The oil level on the Model 50F can be checked very easily because of the two oil level test cocks located on the side of the compressor crankcase. The oil level should be above the bottom cock but below the top cock.

To test for the oil level, run the suction line valve all the way in and reduce the back pressure to zero pounds. (If the head pressure is above 90 pounds, the back pressure will only come down to about five pounds.) Then stop the machine and remove the gauge so that you're sure that there is zero pounds pressure on the crankcase. Open the top oil test cock. If oil comes out of here, let the excess oil drain into the condensate pan under the compressor. If no oil comes out of the top test cock, open the lower cock. If oil comes out, the compressor has sufficient oil.

### The Method of Adding Oil to the 50F Is Different from That on Conventional Compressors

In conventional compressor designs, oil can be added to the crankcase of the machine by placing one end of a length of quarter inch tubing in a jar of oil and attaching the other end to the suction valve gauge port on the compressor. Then by running the compressor, a vacuum will be pulled on the crankcase and atmospheric pressure will drive the oil into the crankcase.

On the Model 50F, this method cannot be used because the compressor body uses truncated pistons (see Fig. 2). If oil is sucked into the compressor at the suction line gauge port, the oil will be passed up through the pistons into the compressor head and very little will return to the compressor through the oil return device.

### How the Oil Return Device Works

The oil return device is shown in position on Fig. 2 and in cross-section in Fig. 3. The oil return device is used to allow oil that has circulated with the refrigerant to return to the compressor readily and to prevent oil that is splashed around in the crankcase from being pumped up through the suction port, through the pistons into the refrigerant circuit. Any small amount of oil that does circulate is due entirely to oil leakage past the piston rings.

As shown in Fig. 3 the oil return device consists of three separate parts. Part B is merely a stud turned down to a small diameter on one end and screwed into a larger drilled stud (A). Stud A in turn is screwed up into the compressor body under the suction port as shown at L. Any oil that enters the suction port drops down through the holes in part A into the crankcase. Part C in Fig. 3 is a small valve disc in which there is a small hole. When the pressure in the suction line is higher than the pressure in the crankcase, suction gas can enter the crankcase through the oil return device. However, if the pressure in the crankcase is higher than that in the suction line, disc C will rise up and shut off the top hole in part A. Then the excessive gas pressure in the crankcase will slowly bleed out of the

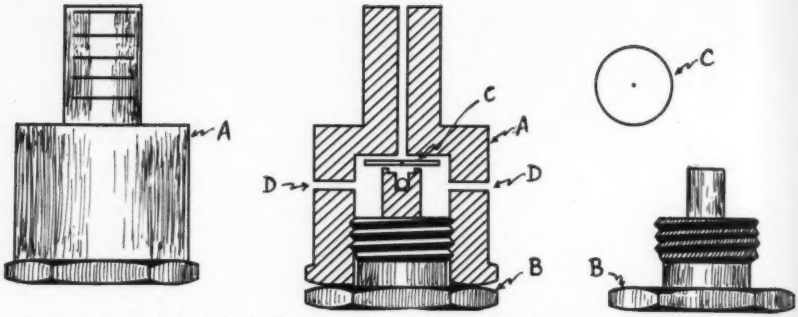



FIG. 3—OIL RETURN DEVICE CONTAINED IN THE COMPRESSOR

crankcase through the hole in disc C. Because of the very small hole in the disc, no oil can be pulled out of the crankcase into the suction port. As soon as the pressure in the crankcase is equal to that in the suction port, the disc C drops and allows oil to flow into the crankcase.

Oil can be added to the 50F by two methods: by removing the oil filler plug (G) in Fig. 1 and pouring oil in through a funnel, or by sucking it in through this plug. When pouring oil through the oil filler plug, a funnel attached to a piece of $\frac{3}{8}$-inch tubing must be used because the fresh air fan (E in Fig. 1) is so close to the compressor body that oil cannot be dumped into the crankcase directly. A tube at least $\frac{3}{8}$ inch in diameter should be used because a smaller tube will not allow oil to flow through it. Also, when adding oil by this method, be sure that the gauge port on the suction valve is open so that a gurgle of gas won't blow the oil out of the funnel all over you.

Most servicemen find it mighty inconvenient to carry a funnel soldered to a piece of $\frac{3}{8}$-inch tubing with them on every service call so they add oil to the compressor by sucking it in through the plug. To do this, remove the oil filler plug (G), and install in its place a quarter-inch pipe by quarter-inch SAE connector. To this attach a length of quarter-inch tubing, the end of which is under the surface of oil in a dry glass or can (see Fig. 4). Next, install a low side gauge and run the suction valve all the way in. In order to pull a vacuum on the crankcase of the compressor, run the head valve of the compressor all the way in and remove the gauge plug from the discharge shut-off valve. Now the head pressure on the compressor will be reduced to zero pounds and as the compressor pulls gas out of the crankcase of the compressor, (through the oil return device) the gas will be discharged into the room through the discharge shut-off valve.

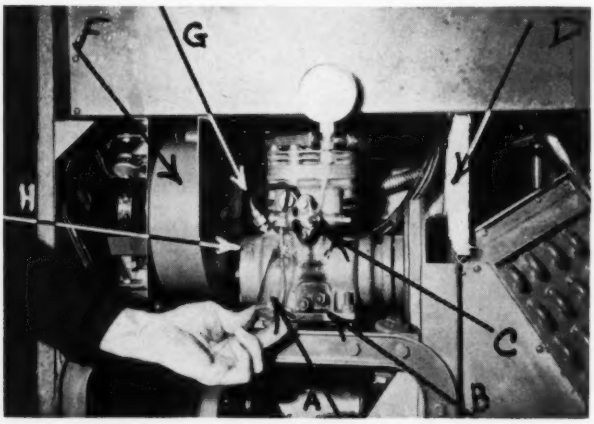



FIG. 4 — METHOD OF ADDING OIL TO THE 50F. Oil is not sucked in through suction valve

A—Bottle of oil
B—Oil level indicators
C—Suction valve
D—Insulating strip
H—Directional indicating arrow
F—Primary air fan

As the compressor operates, oil will be drawn into the crankcase of the machine through the filler hole. Add about three or four ounces of oil at a time; then stop the compressor and open the lower test cock. Keep adding oil until the oil level is up to the lower test cock.

It is important that you add oil a little at a time because the full oil charge is one pint, and hence the job can easily be overcharged. The unit should be charged with a good grade of 175 viscosity refrigeration oil.

*Caution:* Since each time you try the oil level, air will rush into the crankcase, be certain that the compressor is absolutely dry to prevent sucking water into it. After the oil level is restored to normal, reinstall the filler plug and evacuate the crankcase before restoring the system to operation.

*4. How to Check the Discharge Valves:* The discharge valves on the Model 50F can be tested by the conventional leak back test. However, because of the oil return device, extreme care must be taken to avoid obtaining a faulty indication.

As explained above, under "How the Oil Return Device Works," the disc valve C in Fig. 3 closes as soon as the pressure in the suction port becomes less than that in the crankcase. Hence, when the suction line valve is run all the way in, the compressor is started and the pressure in the suction port is rapidly reduced to about zero pounds while the pressure in the crankcase will still be about 35 or 40 pounds. As a result, gas will leak out of the crankcase through the disc valve in the oil return device and cause the pressure in the suction port to build up.

Hence, in order to test the discharge valves on a Model 50F, it is necessary to install a low side gauge at the suction line valve and run this valve all the way in. Then operate the compressor for at least five minutes to be certain that all the gas is out of the crankcase. After the five-minute running period, stop the compressor and watch the low side gauge. If the pressure on the low side exceeds 60 pounds in three minutes time, replace the discharge valves. Before changing the valves, be certain that the discharge valves are at fault. To do this bring the crankcase pressure down to five pounds and with the compressor operating, run the head valve all the way in. Then stop the compressor. If the back pressure remains close to five pounds, open the head valve. If the back pressure increases when the head valve is opened, replace the discharge valves.

# The Question Box

**Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box."**

## HEAT TRANSMISSION THROUGH PIPE

**QUESTION 249. "I would be much obliged if you would tell me where I can get data on heat transmission through copper or iron tubes submerged in brine. I want to determine the proper size of tubing coil for cooling brine in an ice fabrication plant of 400 lbs. per day."**

ANSWER: In a problem of this kind, in determining the rate of heat transmission through the iron or copper pipe, either one, there are a number of factors to take into account. One of these is the rate of circulation of the fluid around the pipe.

For instance, in air circulating over a copper or iron pipe surface, the rate of heat transfer will vary somewhere in the neighborhood as low as .9 Btu. per square foot of pipe surface per degree temperature difference per hour.

In some cases that rate of heat transfer, with the pipe or tube installed or located in open air, may go up as high as 3 Btu. per square foot. This difference in rate of heat transfer depends on the rate of air circulation. If you happen to have a counter with a back bunker, where you get very poor air circulation, that rate may be as low as .9 Btu. per square foot per degree temperature per hour. If you happen to have a coil located in a grocery type refrigerator or restaurant refrigerator, where you have a very good baffling job and air circulation

over the coil, that heat transfer may be 3 Btu. per square foot. For an ordinary surface installed in open air I believe it will average in the neighborhood of 2 Btu. per square foot per degree temperature difference per hour. That is for any surface in air.

Generally, if it is piped, we can take that temperature difference as being the difference in temperature between the evaporating refrigerant and the air because the heat transmission through the iron pipe or copper tubing, whichever it may be, will be so much greater than the heat transmission from the air through the tube that the metal in the tube is not important.

If we have a forced air circulation by the pipe, we may increase that heat transfer, I believe, as many as five times. If we have a fin tube, I would say, we can't depend on the fin temperature being the same as the tube temperature, and consequently, we have to figure the temperature of the fin surface rather than the temperature of the evaporating refrigerant. In general, I usually estimate that the fin surface on a fairly well constructed evaporator coil will be at an average of five degrees higher than the evaporating temperature. How much higher that actually is will depend on the ratio of sizes of evaporator coil and condensing unit; so, that five degrees is just simply a figure to work from in an average case.

### Submerged in Brine

As far as the heat transmission is concerned, in passing from brine to copper tube or iron pipe, I believe we can take about five times the rate of heat transfer for brine that we have for air. In other words, we have ten Btu. per square foot of pipe surface per degree of temperature difference per hour. If we have an ice fabrication plant where we want 400 lbs. ice per day—I don't know whether that means 400 lbs. ice melting equivalent or making 400 lbs. of ice—if you want to make 400 lbs. of ice, you will have to have more than 400 lbs. ice melting equivalent, but if we know the number of pounds of ice melting equivalent a day that we need, we can take the pounds of ice melting equivalent times the number of Btu.'s ice melting equivalent gives us the Btu. per hour. We divide that for still brine by a factor of ten and that will give us our Btu. per square foot, our Btu. per square foot per degree temperature per hour, so if we divide the Btu. per hour by the factor ten and also by the temperature difference we have between our refrigerant or pipe temperature and our brine, that will give us the square foot in the pipe surface, and then we can determine the length of pipe required by knowing the diameter, getting the perimeter around the pipe, then taking the length in inches, the perimeter of the pipe in inches, that will give square inches, and divide that by 144 and that is the square feet.

Naturally, if we have a forced circulation of brine or water around a copper or iron pipe, we will increase our rate of heat transfer considerably, and increase in heat transfer will depend on the rate of brine circulation, among other things.

## KELVINATOR CHECK VALVE

**Question 250. I have a few questions I would like to have answered. One is concerning a high side float—Kelvinator. A new check valve was installed at the evaporator in the same place as the old one taken out. This check valve is an Imperial check valve. Most of the time, while the machine is running, this valve causes a noise, which is caused by the liquid entering the evaporator. The noise is caused by the valve opening and closing. It does not seem to me that this should be natural. A new high side float and receiver was also installed. The system seems to have a proper charge—gauge pressures around eight inches vacuum and 60 lbs. high side, using sulphur. This is a three-tray domestic Kelvinator. I would like to have your opinion on this.**

**Can an activated alumina dehydrator be left in the system for any length of time without any after effects caused by leaving the dehydrator in the system, for example, several years? My idea is any dehydrator should be taken out after serving its purpose, but in most cases, an activated alumina dryer is left in as a permanent issue.**

Answer: The trouble you are experiencing with the Kelvinator check valve is a perfectly normal and very common trouble experienced with these valves. It is not due in any way to any other fault or condition in the system, but is merely part of the normal function of this valve.

The valve, as you no doubt know, is designed to maintain sufficient pressure in the liquid line between the float and check so that no frosting will occur at this point, and there is, therefore, always a pressure, and consequently, a continuous flow through this valve, while the machine is in operation.

The noise can be usually overcome by turning the valve 15 or 20 degrees from the upright position, thus eliminating somewhat of the snap-action which causes the clicking noise. However, if this does not overcome the trouble, I know of nothing more you can do about it.

In regards to activated alumina dehydrators, I know of no harm that they can do to the system by being left in, insofar as adding any deposits of any kind to the gas. However, I agree with you in your statement that all dehydrators should be removed after they have served their purpose. By being left in the system, they are merely adding restriction to the flow of gas, and are no longer of any value.

## WHERE TO USE THERMO VALVE

**Question 251. When do you install a thermostatic expansion valve, and when a normal expansion valve? In ice cream jobs with brine, which kind of valve do you prefer?**

Answer: I would say in general that the thermostatic expansion valve is always used on commercial work, and that the automatic expansion valve is confined almost entirely to domestic work.

The difference between these two valves is that the automatic valve maintains a constant pressure in the evaporator, while the thermostatic expansion valve regulates that pressure according to the demands of the evaporator, thus giving a much higher efficiency in overall operation where the thermostatic valve is used.

It must be remembered, also, that in your combination of controls, the automatic expansion valve cannot operate with a pressure switch, and must be confined to a thermostatic control only, whereas a thermostatic expansion valve may be operated in conjunction with any type of motor control.

For an ice cream job, I would most certainly recommend a thermostatic expansion valve.

## XYLENE IN G. E. AMMONIA PROBLEMS

**Question 252. I repaired a General Electric seal refrigerator unit with a stopped-up liquid line just where it enters the evaporator.**

**I cut the line, unstopped it, soldered up the line, using a copper sleeve, added a teaspoonful of xylene, recharged unit and started it up, and it has been operating all right.**

**Please advise if the xylene will have any detrimental effects on the insulation of the motor winding, or any other part of the system.**

**What would be the effects of getting water in an ammonia refrigerating system? It couldn't freeze, as it would be absorbed by the ammonia, wouldn't it?**

**Would it, in great amounts, dilute the ammonia and change the evaporation temperature for a given pressure? If it did that, it would tend to lower head pressure for given conditions.**

**Why do you most always see suction lines and sometimes compressor of an ammonia system frosted? Can't the ammonia gas be superheated high enough without wasting refrigeration to keep the suction temperature above freezing temperature?**

Answer: While xylene has been used in a number of cases for the same purpose that you have used it, we have had no information as to the success obtained with it. We know that xylene is used considerably in the paint industry, as a solvent, and I would, therefore, take it for granted that it would dissolve the varnish on motor windings. However, I believe that all motor windings in hermetically-sealed machines are not varnished, and use no other insulation other than the silk and cotton covering; therefore, there should be no difficulty from that source. I know of no other trouble it would cause. I do not mean to convey the opinion, though, that this is a good practice, since no refrigerating machine should contain anything but pure oil and gas. Xylene is a solvent only, and if you have carbon, or any other deposit in the machine, this agent can only break it up so that it will float in suspension throughout the system, and would probably cause trouble at screens or orifices.

The effect of small amounts of water in ammonia refrigerating systems should not be detrimental in any way I can think of, unless it would cause corrosion in the compressor valves. Large amounts of water, of course, will freeze out at the expansion valve, or in the evaporator. While ammonia will absorb water, or rather water will absorb ammonia, the water is distilled out at the expansion valve or the evaporator. Large amounts of water, of course, will change the evaporation temperature, and will change the entire characteristics of the solution.

Ammonia, of course, can be controlled as to superheat just as well as any other refrigerating gas. The only reason I can give for your last question is that the ma-

jority of the older type ammonia systems did not incorporate the finer points of control that are used today. The majority of these units used a hand type of expansion valve, or plain automatic diaphragm type, and in many cases, the motor control used was a room thermostat located in the refrigerated space, or in many cases, the motor was controlled by hand. The proper control of superheat can only be done through a thermostatic valve.

### SERVICING THE G. E.

**QUESTION 253. I have a service problem on a DR-2, Form F, General Electric refrigerator unit. The float valve on this unit is stuck shut. When purging at the float valve, liquid comes out. We have heated the float valve and can get the float to lift with a float valve magnetic lifter, but no refrigerant goes through. At least, I cannot hear it rushing or boiling in the evaporator. I think the orifice is plugged in the float valve somewhere.**

**Can you give me any further suggestions as to what to do with this unit? Could we replace this float valve assembly with an Imperial high side float assembly, and do you think it would work successfully?**

**ANSWER:** From the description of your trouble, I can see no other fault than that which you mention; that is, a clogged orifice in the float valve outlet.

I see no objection to using an Imperial high side float to replace the General Electric float in this case, and I believe it should work very satisfactorily. However, it is quite probable that since you have to remove the old float, and will probably have to cut the tubing, that while you have it apart, you will be able to clear the orifice by inserting a small drill or wire through the float outlet.

There is the possibility of course, that while this is the apparent trouble at present, the real trouble may be due to moisture in the system, or corrosion which may again clog the float at a later date. If such is the case, I can only suggest that the unit be entirely overhauled or replaced.

# NEW MECHANICAL DEVICES

## Service Tools and Special Equipment

**Under this heading there will be published illustrated descriptions of new or improved service tools and equipment for the Service Engineer. Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.**

### LICENSED TO MANUFACTURE C-Y PURGING AND CHARGING TOOL

THE C-Y Manufacturing Co., at Jamaica, New York, which holds patents on the Universal Purging and Charging Tool for hermetic machines, has licensed the Mueller Brass Co., of Port Huron, Mich., and the Kerotest Manufacturing Co., of Pittsburgh, Pa., to manufacture this tool under their license.

### NEW BONNEY RATCHET WRENCH

BONNEY Forge & Tool Works, Allentown, Pa., has just issued a new catalog of Refrigeration Tools known as No. 38R.

Printed in two colors throughout, it shows a complete line of extra-small, small and standard sockets with detachable handles and attachments, special refrigeration sockets, a variety of refrigeration ratchets in reversible and non-reversible types, special refrigeration wrenches, flaring tool, pinch-off tool, tube benders, standard types of

NEW RATCHET WRENCH

open-end, right-angle, box and miniature wrenches, as well as a wide variety of pliers, punches, chisels, screw drivers, adjustable wrenches and miscellaneous tools.

The manufacturer claims it to be the most complete catalog of refrigeration service tools for use on domestic and commercial installations ever issued.

It is printed in the standard 8½" x 11" size and punched for use in either a Kalamazoo or standard three-ring binder.

Copies will gladly be mailed on request.

The 15-inch Ratchet Wrench illustrated has been added to their line by Bonney Forge & Tool Works, to meet an increasing demand for a ratchet of that length for use with ½-inch square drive sockets and handles and attachments.

Known as No. 4098, it is of the reversible type. A feature of the wrench is the fact that it can quickly be changed into a 10-inch ratchet for use in close quarters by simply removing the extension which screws deep into the handle of the 10-inch end. The knurled double grip permits the maximum leverage to be exerted.

It is drop-forged of Zenel Steel, used only in Bonney Tools, is chrome-plated and buffed to a high, permanent lustre.

The tool, the manufacturer claims, is highly desirable to mechanics because it offers all the advantages of both 10-inch and 15-inch ratchets in a single tool at only slightly increased cost over the 10-inch size.

Full information will gladly be furnished by the manufacturer to all interested.

## REPS EXTRACTOR

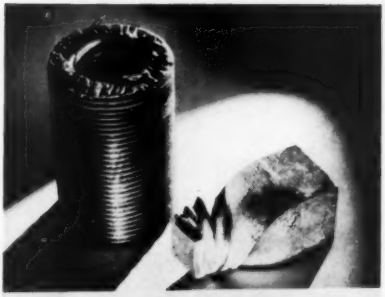
REPS TOOL INC., 220 Delaware Ave., Buffalo, N. Y., announces the Reps Extractor which completely answers industry's age-old riddle of extracting broken pipe and studs.

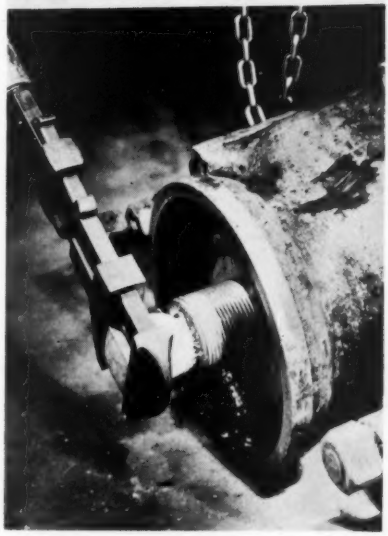
The patented four-point grip prevents Reps Extractor from reaming and assures strong bite without hammering or pounding. Shallow grip greatly lessens any expansion and jamming.

Built-in reamer automatically removes burrs from pipe, eliminating interference with Extractor's bite and minimizing cause for expansion of broken piece. The Extractor pulls rather than reams.

Compact one-piece design makes the Extractor strong, durable and easy to handle. Heat-treated forged steel with a Brinell hardness of 490 gives a toughness harder than any material with which the Extractor will come in contact, such as iron, steel, bronze, brass or special alloys. Electrolytically plated cadmium provides permanent rust-proof surface.

Broken pieces of pipe are removed by inserting the Reps Extractor straight into the pipe so all four points bite at the same time. Turn the Extractor with a wrench in the direction of the Extractor's threads. To remove studs, screws or bolts, drill a hole in the exact center of broken part just deep enough for the Extractor to get its shallow grip.





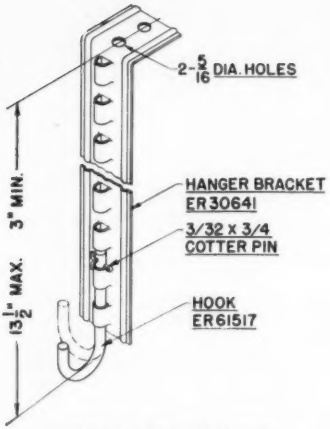
DEMONSTRATING THE EXTRACTOR

The complete set of only 10 Reps Extractors fits every size and class of pipe, standard, heavy or extra heavy, from ⅛ inch to 2 inch. This same set of tools fits every size of studs, screws and bolts from 7/16 inch to 3½ inch.

## NEW HANGERS FOR COILS ANNOUNCED

FEDDERS Hangers for Coils provide a simple, easily installed means of suspending Non-Frost Coils. The one size gives a wide range of adjustment from 3 inches to 18½ inches in ½-inch steps from ceiling to bottom of hook.

Where coil is mounted close to ceiling and the full depth of the 18½-in length is not




FEDDERS COIL HANGER

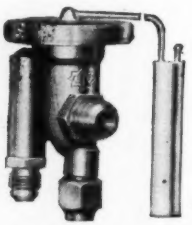
needed, the bracket can be easily cut off with snips.

Hooks are drilled with two sets of holes drilled at 90 degrees so that hanger brackets can be mounted either parallel or at right angles to the coil.

Hanger brackets, hooks and cotter pins are made of brass to eliminate all possibility of rust. They are finished in Fedders Silver Satin to match the coil.

## ALCO "TK" THERMO VALVE

FOR several years, the Alco "T" series Thermo Valves have proven to be the most accurate, trouble-free refrigerant controls on the market. Now Alco offers the new model "TK" Thermo Valve at a price within the reach of all small refrigeration and air conditioning systems.



ALCO MODEL "TK" VALVE

Features of this valve are the stainless spring steel diaphragm and the metal housing which are welded together forming one piece of metal. The diaphragm construction is such that the maximum strain of motion is at a point remote from the weld. This means that the slight weakening of the metal which might be caused by grain growth resulting from the weld does not take place at the same point where the diaphragm metal receives the greatest mechanical stress.

The Alco "TK" valve design now permits the incorporation of more than adequate filter area. For years Alco, although a strong advocate of proper filtration, has refused to build small filters or strainers into small Thermo Valves. Alco has always maintained that unless adequate filter area can be built into a valve it is best not to include any filter at all.

The all-metal construction and the welded power assembly provide a stronger, sturdier valve which can be installed and mounted without danger of damage.

The new Alco Type "TK" Valve is the smallest "T" series valve yet designed. It is light in weight and small in over-all dimensions. While every bit as sturdy as the rest of Alco products, great consideration was given in its design to simplify and reduce the number of parts and to eliminate excess weight. A variety of capacities and line sizes are offered.

## AIR CONDITIONING CALCULATIONS

IN practically all air conditioning calculations involving changes in air conditions from one temperature to another or one humidity to another, it is necessary to determine certain air characteristics so that the changes can be translated into heating, cooling, humidity, and air volume requirements.

The usual method for obtaining this information is through the use of the "Psychrometric Chart". This is a graph which shows the thermal characteristics and properties of mixtures of air and water vapor at various temperatures. It can be used to determine such characteristics as dry bulb, wet bulb, and dew point temperatures, and relative humidity when any two of these are known. Its most valuable use, however is in finding other properties of air such as:—

1. Sensible heat of dry air.
2. Volume of one pound of dry air.
3. Total heat of one pound of air.
4. Grains of moisture in one pound of dry air.
5. Latent heat of one pound of air.

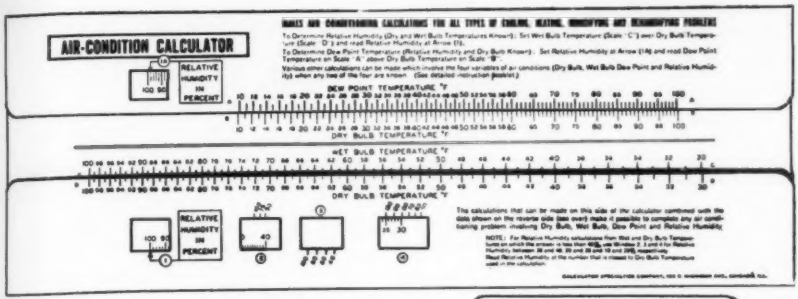



FIG. 1. FRONT VIEW OF CALCULATOR

6. Volume of vapor in one pound of dry air.

7. Vapor pressure.

All of these properties can be determined when the dry bulb, wet bulb, and dew point temperatures are known. The sensible heat and volume per pound of dry air are determined from the dry bulb temperature. The total heat is determined when the wet bulb temperature is known. And the grains of moisture, latent heat, volume of vapor, and vapor pressure are determined from the dew point temperature.

A new Air Condition Calculator recently developed makes possible the determination of all of these important properties of air in a very simple and accurate way. Instead of referring to the psychrometric chart and following several lines on a graph, the results are obtained by a simple manipulation of a slide.

On the front side of the calculator (See Fig. 1), there are two sets of scales. Scales "C" and "D" at the bottom combine the relationship between dry bulb and wet bulb temperatures to obtain relative humidity (window 1 lower left). Scales "A" and "B" combine the relationship between dry bulb and dew point temperatures to obtain relative humidity (window 1A upper left). This combination of scales makes it easy to determine the three temperature values when only two of them are known or when one is known together with the relative humidity.

Example 1 Air has a dry bulb temperature of 80 degrees F. and a wet bulb temperature of 65 degrees F. Find the relative humidity and the dew point temperature.

Solution: *Step No. 1* Set 65 degrees on scale "WC" over 80 degrees on scale "D" and read 45 percent relative humidity at window 1.

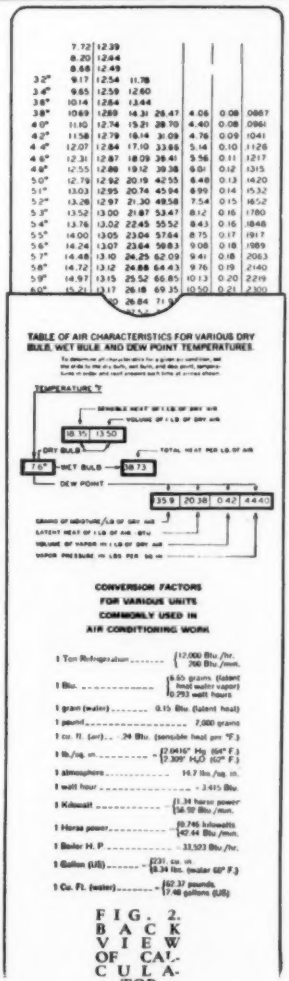



FIG. 2. BACK VIEW OF CALCULATOR

● A magician can fool your eye but he can't fool a BTU. Fedders Coils are ALL-COPPER. Every engineering authority rates Copper as double the heat transfer ability of the next commercial metal.

● Fedders Copper Fins and Copper Tubes both have the same rate of expansion, and they eliminate electrolysis commonly occuring when two different metals are used... Fedders Fins STAY TIGHT ON THE TUBES.

● There are no obstructions inside of Fedders tubes to decrease back pressure and reduce compressor efficiency.

● Conservatively and accurately rated—use Fedders ALL-COPPER Coils and be SURE! *Sold by Representative Suppliers.*

**FEDD R**

**MANUFACTURIN OMPA**

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*Step No. 2* Set 45 percent relative humidity at window 1A and read 56.5 degrees dew point temperature on scale "A" above 80 degrees on scale "B".

Example 2 Air has a dry bulb temperature of 95 degrees F. and a dew point temperature of 75 degrees F. Find the relative humidity and the wet bulb temperature.

Solution: *Step No. 1* Set 95 degrees on scale "B" under 75 degrees on scale "A" and read 52 percent relative humidity at window 1A.

*Step No. 2* Set 52 percent relative humidity at window 1 and read 80 degrees wet bulb temperature on scale "C" above 95 degrees on scale "D".

Example 3 Air has a dry bulb temperature of 80 degrees F. and a relative humidity of 50 percent. Find the wet bulb and dew point temperatures.

Solution: *Step No. 1* Set 50 percent relative humidity at window 1 and read 67 degrees wet bulb temperature on scale "C" above 80 degrees on scale "D".

*Step No. 2* Set 50 percent relative humidity at window 1A and read 59 degrees dew point temperature on scale "A" above 80 degrees on scale "B."

Example 4 Air has a wet bulb temperature of 50 degrees F. and a relative humidity of 60 percent. Find the dry bulb and dew point temperatures.

Solution: *Step No. 1* Set 60 percent relative humidity at window 1 and read dry bulb temperature of 57.3 degrees on scale "D" below 50 degrees on scale "C".

*Step No. 2* Set 60 percent relative humidity at window 1A and read 43.5 degrees dew point temperature on scale "A" above 57.3 degrees on scale "B".

The preceding problems illustrate how it is possible to obtain the dry bulb, wet bulb, and dew point temperature values. When these values are obtained it is then possible to obtain all of the other properties of air that we are interested in by referring to the table of air characteristics on the back of the Air Condition Calculator. (See Fig. 2.)

First the slide is set so that the dry bulb temperature appears in the temperature window. With this setting the sensible heat of one pound of air and the volume of one pound of dry air shows in the first two windows as indicated by the dry bulb arrows. Next the slide is set so that the wet bulb temperature appears in the temperature window. With this setting the total heat of one pound of air shows in the window pointed to by the wet bulb arrow. The slide is then set so that the dew point temperature appears in the temperature window. With this setting the grains of moisture, lat nt heat, volume of vapor, and vapor pressure appears in the windows indicated by the dew point arrows.

Example 5 Tabulate all of the properties of air as indicated by the various conditions referred to in the first four examples.

Solution: By proceeding along the lines just outlined we obtain the following answers to this problem:

| | Example 1 | Example 2 | Example 3 | Example 4 |
|---|---|---|---|---|
| Dry Bulb Temp. | 80° F. | 95° F. | 80° F. | 57.3° F. |
| Wet Bulb Temp. | 65° F. | 80° F. | 67° F. | 50° F. |
| Dew point Temp. | 56.5° F. | 75° F. | 59° F. | 43.5° F. |
| Sensible heat of one lb. of dry air | 19.32 | 22.95 | 19.32 | 13.82 |
| Volume of 1 lb. of dry air (cu. ft.) | 13.60 | 13.98 | 13.60 | 13.03 |
| Total heat of 1 lb. of air | 29.65 | 42.64 | 31.15 | 20.19 |
| Grains of moisture per lb. of dry air | 68.10 | 131.4 | 74.60 | 41.76 |
| Latent heat of 1 lb. of air | 10.31 | 19.71 | 11 28 | 6.36 |
| Volume of vapor in 1 lb. of dry air | 0.205 | 0.40 | 0.22 | 0.127 |
| Vapor pressure in lbs. per sq. in. | 0.2259 | 0.4295 | 0 2471 | 0.1394 |

Note: All heat values are expressed in B.t.u.
Where fractions of a degree are encountered the answers are interpolated.

As may be seen from the foregoing, the Air Condition Calculator provides a short cut to many tedious and time-absorbing calculations encountered in air conditioning work. Procurable from the office of this publication for the amount of $1.50, the device will save many times its value in time and effort saved.

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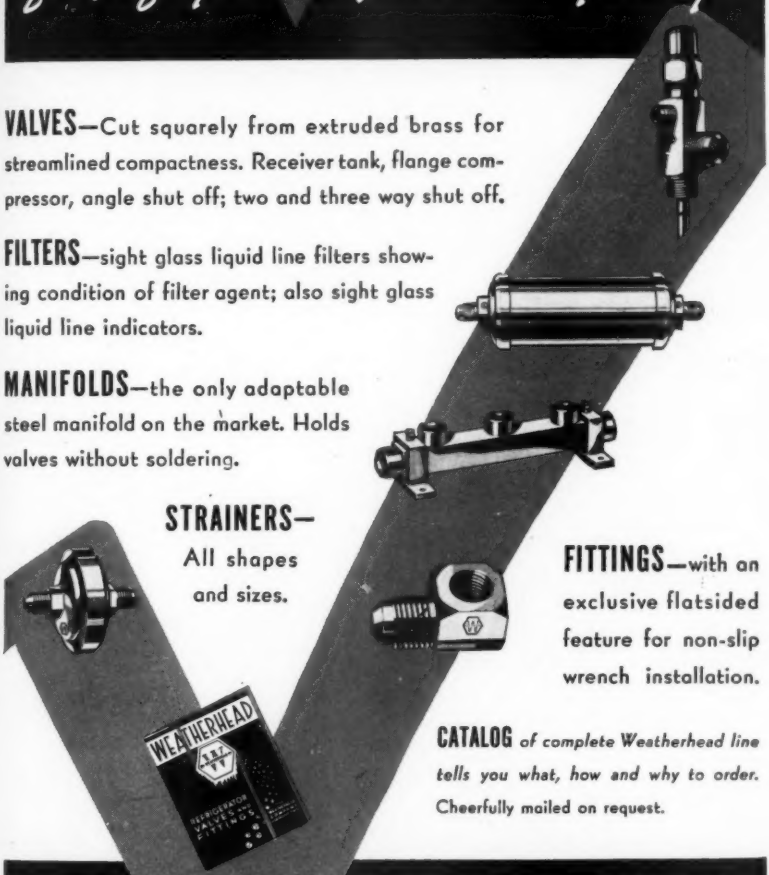


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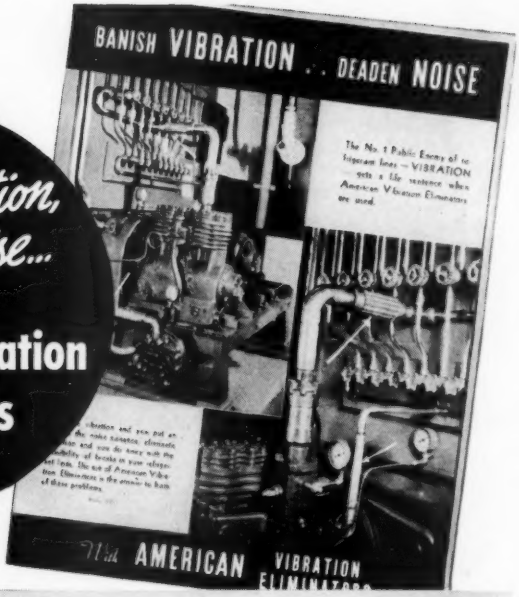
**CATALOG** *of complete Weatherhead line tells you what, how and why to order.* Cheerfully mailed on request.

# WEATHERHEAD

CLEVELAND • OHIO

**CANDID SHOTS OF THE CHICAGO CHAPTER STAG.** Over 450 members and visitors were in attendance to enjoy a very successful evening. 1. One of those comedy face-slapping acts. 2. Geo. Monjian, Chairman Entertainment Committee, and Fred Roth, President, "unlax" after it is all over. 3. Wonder why the donkey has such a long face. Perhaps the rider has something to do with it. 4. Beautifully executed dancing and fiddling. 5. One of the gaming devices used —can you see the live mouse just heading for a numbered hole? 6. Demonstrating some of the positions required of a service engineer when servicing a domestic refrigerator.

# *Isolate vibration, Deaden noise...* with Seamless Vibration Eliminators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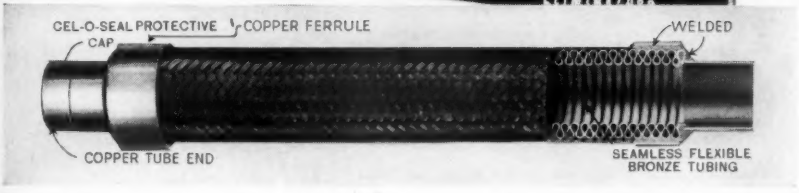


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American *Seamless* Vibration Eliminators are designed to be installed easily by any service man. Manufactured in various sizes and lengths to fit any standard size of copper tube or solder fitting. American *Seamless* Vibration Eliminators come to you thoroughly cleaned, dried out and sealed with air-tight, moisture-proof caps. Write for Bulletin VE-2, shown above.

ANACONDA

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# On to Buffalo!

By GEORGE E. WILSON

The cities are full of pride,
Challenging each to each—
This from her mountain side,
That from her burthened beach.
—*Kipling.*

IN the penning of the above, Kipling was right. That a certain city should have, by reason of its geographical location and the activities of its civic organizations, advantages possessed by no other locality, is acknowledged. It would be a very prosaic life, indeed, if each and every community possessed, in common, the commercial advantages and beauties of nature with which this land of ours is so richly endowed. Therefore, it is only natural that in the addressing of an invitation to his colleagues to attend a national convention to be held in his city, one is prone to extol the advantages, virtues and romance of his locality.

However, in composing such an invitation, to say that which has not been said before or to say that which has been said before, giving it a new theme, one would have to possess the genius of that master of writers, O. Henry.

In speaking of the romance of cities, one is reminded that Frank Norris wrote: "Fancy a novel about Chicago or Buffalo, let us say, or Nashville, Tennessee! There are just three big cities in the United States that are story cities—New York, of course, New Orleans, and, best of the lot, San Francisco." And O. Henry wove the romance of Azelea Adair intermixed between civic reports of Nashville, in his "A Municipal Report." O. Henry ended his story with the statement: "I wonder what's doing in Buffalo!" To this, may I add a simple homespun invitation: "Come to Buffalo—be our guests, thereby allowing us to extend to you, the hospitality for which Buffalo, the Queen City of the Lakes, is noted."

S S S

Oscar C. Lennis
Michigan

I would not be without this magazine while I am in the refrigeration business, as I find it full of very helpful information, and I think every refrigeration service man should have it on his desk.

---

Geo. Hartenstein
New Jersey

Although my subscription has not expired yet, please renew it for another year. I do not wish to miss any copies.

---

H. C. Heumann
Missouri

Thanks for the R.S.E. magazine. I practically devour it. The only trouble with it is that it doesn't come often enough.

# The Unit Labor Survey

UNDER the committee chairmanship of Mr. P. B. Reed, the Refrigeration Service Engineers Society has undertaken a survey of the unit labor required in refrigeration installations. The purpose of this study is to develop a system which will permit a more accurate means of estimating in advance the labor cost of installation or service operations.

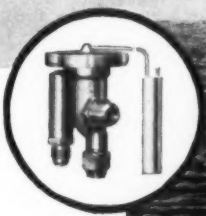
During the annual convention held in Chicago, Mr. Reed explained the purpose of this survey as follows:

"Those of you who have had occasion to call for an electrical bid, particularly wiring, have perhaps become surprised at the uniformity of the bids received from the various electrical contractors. You have perhaps suspected collusion. I think in most instances, however, that has not been true.

"The electrical contractors, for the most part, have practically identical costs on their materials. They have developed a system of estimating labor that is so accurate that necessarily their estimate of the total amount of labor required for a job is also quite accurate and it follows, therefore, that the total estimate of the job, including labor and material, runs very close together.

"Some years ago, the Association of

# ALCO VALVE "STRAIGHT LINE" REFRIGERANT CONTROL *Increases Evaporator Capacity and Efficiency*



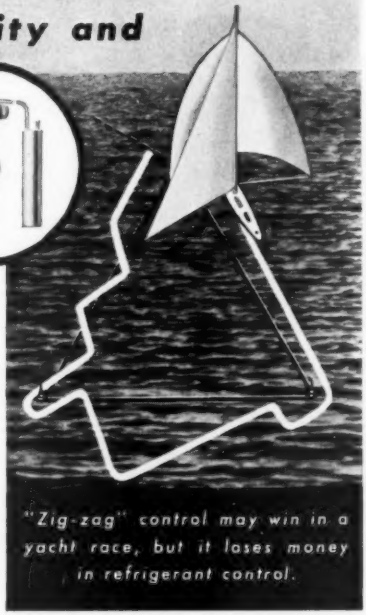
ALCO THERMO VALVES are engineered to definitely confine the swing in the line of complete evaporation to the narrowest limits—to utilize the maximum amount of coil surface at all times. This gives increased capacity and highest efficiency to any evaporator installation.

On the other hand, ordinary control allows wide swings in the evaporator—as shown in the diagram—permitting liquid to return to the compressor one instant and starving a good portion of the coil the next instant.

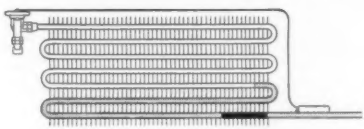
Alco gives you "straight line" control, for every Alco Thermo Valve is designed to produce the highest possible evaporator efficiency. The elimination of excessive friction, proper proportioning of component parts, correct speed of response, and proper flow characteristics are all factors in the design and manufacture of Alco Thermo Valves (which provide this close control).

Years of leadership in the design and manufacture of the most accurate refrigerant controls have resulted in wide use and acceptance of Alco Thermo Valves throughout the refrigerating and air conditioning industries.

Write for information and bulletin describing the Alco line of engineered refrigerant control.



*"Zig-zag" control may win in a yacht race, but it loses money in refrigerant control.*



*Short black line illustrates limited Alco swing, shaded portion of coil shows extent of swing resulting from ordinary type control.*

## ALCO VALVE COMPANY

2630 BIG BEND BLVD. ST. LOUIS, MISSOURI

ENGINEERED REFRIGERANT CONTROLS FOR HIGHEST EVAPORATOR EFFICIENCY

## UNIT LABOR SURVEY OF REFRIGERATION INSTALLATION

1 - Install one gravity finned coil: In case _____

In reach-in box _____ In walk-in cooler _____

2 - Install one forced convection coil: In case _____

In reach-in box _____ In walk-in cooler _____

3 - Place machine unit preparatory to connection. Insert minutes after each hp.

1/6 - 1/2_____ 3/4 - 1-1/2_____ 2 - 5_____ 7-1/2 - 15_____ 20 - 30___

4 - Put on motor pulley and fan and mount motor on machine:

1/6 - 3/4 hp._____ 1 - 5 hp._ _____ 5 - 30 hp._____

5 - Pump vacuum on system and release charge. Insert minutes after each hp.

1/6 - 1/3_____ 1/2 - 3_____ 5 - 10_____ 10 - 30_____

6 - Oil motor bearings on machine unit: 1/6 - 3/4 hp._____ 1 - 30 hp._____

7 - Add refrigerant to system (per lb.) F12 & Methyl Chloride_____ $SO_2$_____

8 - Check oil level of compressor_____

9 - Set and adjust: Pressure control_____ Thermostat controlling machine_____

Thermostat controlling blower fan_____ Thermostat controlling solenoid valve____

10 - Place air conditioner blower unit. Insert time for each size:

| | 1 ton | 2 tons | 3 tons | 5 tons | 7-1/2 tons | 10 tons | 15 tons | 20 tons |
|---|---|---|---|---|---|---|---|---|
| Ceiling type | | | | | | | | |
| Floor type | | | | | | | | |

11 - Assemble refrigerant heat exchanger to suction line using factory-made tees:

| 5/8" & under | 3/4" to 1-1/8" | 1-3/8" to 2-1/8" | 2-5/8" to 4-1/8" |
|---|---|---|---|
| | | | |

12 - Mount automatic expansion valve. Size 0 to 3 tons Freon_____

| Size: | 0 to 3 tons | 5 to 10 tons | 10 to 30 tons |
|---|---|---|---|
| 13 - Mount thermostatic expansion valve and secure bulb | | | |
| 14 - Mount solenoid, C.P.,two-temp. or back pressure valve | | | |

| Size: | 1/6 - 1/3 hp. | 1/2 - 1-1/2 hp. | 1-1/2 - 5 hp. |
|---|---|---|---|
| 15 - Oil motor on air conditioner blower unit | | | |

16 - Set up, open valves, adjust pressure and temperature of following self-contained equipment placed by others including recheck next day, but exclusive of water, drain and electric connection.

Household Refrigerators - Hermetic: to 7 cu.ft._____ 8 to 10 cu.ft._____

Household Refrigerators - Convent.: to 7 cu.ft._____ 8 to 10 cu.ft._____

Water coolers - air cooled: to 1/6 hp. _____ 1/4 to 1/3 hp._____

Bottle coolers - air cooled: to 1/6 hp. _____ 1/4 to 1/3 hp._____

| Size: | 2-hole | 3-hole | 4-hole | 6-hole | 8-hole | 10-hole |
|---|---|---|---|---|---|---|
| Ice cream cabinets air cooled | | | | | | |
| Ice cream cabinets - water cooled | | | | | | |

| Size: | to 1/3 hp. | 1/2 to 3/4 hp. | 1 to 1-1/2 hp. |
|---|---|---|---|
| Room coolers - recirculation only - water cooled | | | |
| Room coolers - recirculation with window ducts - water cooled | | | |
| Room coolers - recirculation with window ducts - air cooled | | | |

17 - Run-up and tighten flared tube nut 1/4" to 3/8"_____ 1/2" to 3/4"_____

| Size: | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 |
|---|---|---|---|---|---|---|---|
| 18 - Cut, prepare and flare tubing for flared tube nut | | | | | | | |
| 19 - Run copper tubing - soft flexible Per foot | | | | | | | |

20 - Cut, prepare, clean, flux and sweat joint - Size

| 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1-1/8 | 1-3/8 | 1-5/8 | 2-1/8 | 2-5/8 | 3-1/8 | 3-5/8 | 4-1/8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ✓ | | | | | |

21 - Run copper pipe - hard, rigid, with sweat connections - Per foot - O.D. Size

| 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1-1/8 | 1-3/8 | 1-5/8 | 2-1/8 | 2-5/8 | 3-1/8 | 3-5/8 | 4-1/8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |

22 - Connect cylinder and charge system with Nitrogen or $CO_2$ _____

| Size: | 1/4 - 1-1/8" | 1-3/8 - 4-1/8" |
|---|---|---|
| 23 - Test flared or sweat connection with soap and water | | |
| Test flared or sweat tube connection with torch | | |
| Test flared or sweat connection with ammonia swab | | |

24 - Lithage, run in and tighten pipe thread end of flared tube or sweat fitting (exclusive of tube connection) 1/4 - 3/8"_____ 1/2 - 3/4"_____ 1" - 2"_____

25 - Tin, run in and sweat pipe thread end of flared tube or sweat fitting (exclusive of tube connection) 1/4 - 3/8"_____ 1/2 - 3/4"_____ 1" - 2"_____

Electragists, which is an association of electrical contractors, proposed and carried forth a survey to develop a similar system to this one that we propose.

"They sent out to their members, and to other sources who were able to give them the data they required, questionnaires to be filled in, showing the amount of labor required for each unit of operation.

"After a considerable amount of data was collected and compiled and put in usable form, they had this set of tables prepared for distribution to their members.

"Those members are now able to take those tables along with their bill of materials, and its use is something like this: They go to a job and either look at the job itself, or take their information from the blue prints, and set down their bill of material, or what material will be required. Alongside of those materials, they put down the cost of the materials per unit and extend them. Still further over, on the same paper, they put down the unit of labor for each one of those materials. For instance, if they have 100 feet of No. 14 wire, they put down the labor unit for that size wire in that length. Then they extend that. As a result, when they get done, they can total up their material, total up the number of hours of labor, cost of labor, and they come out close to being right.

"One job may run over what they expect, of course. They may have a concrete wall fourteen inches thick to knock a hole through which they did not anticipate, or a few things of that sort, but over any number of jobs, it works out very closely.

"It appears to me that this Society is probably best able to develop such a system, and its value to you and the rest of the industry is obvious.

"You fellows are not only servicemen, but in most instances, you are the operators of your own businesses. Your cost of doing business, your cost of estimating a job, the cost of that job, is very important.

"Don't be too optimistic as to how long it will take to do it, because it is very doubtful if we will have any considerable amount of information in any form that will be of much value for at least a year."

As Mr. Reed stated, this work cannot be accomplished in a short time. It will take at least a year. The data will be of no value unless taken from actual experience in the field. Estimates, or guesses, of the time required will naturally be of no value in the final analysis.

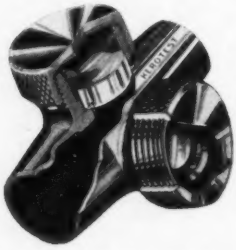

*In Popular Demand!*

**KEROTEST**

**BULLS-EYE**

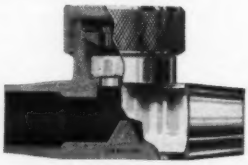
**LIQUID INDICATORS**

**WITH KNURLED SEAL CAPS**



KEROTEST LIQUID INDICATORS are designed in both single and double bulls-eyes and are equipped with a knurled seal cap fitted with a relatively soft gasket to facilitate pulling up finger tight. This protects the glass bulls-eyes and also provides a secondary seal against leakage, an important feature where large liquid lines and consequently large quantities of expensive refrigerants are employed.

Excellent visibility of the refrigerant is provided in the Kerotest Types 652-S and 653-S Liquid Indicators designed with two bulls-eyes inclined at a 90 degree angle. A flashlight directed into one port reveals a complete cross section of the refrigerant in the other port.



Investigate the business opportunities of installing Kerotest Liquid Indicators in the large commercial and air conditioning installations you service. Ask your KEROTEST jobber about it today.

KEROTEST

**KEROTEST MANUFACTURING CO.**

**PITTSBURGH, PA.**

## FOR QUICK SERVICE

KEROTEST

REGISTERED U.S. PAT. OFF.

## REFRIGERATION PRODUCTS

### Phone your nearest distributor

### JOBBERS WITH LOCAL STOCKS

Albany, N. Y. ..... Hoy & Co.
Allentown, Pa. .. General Refrigeration Supply Co.
Atlanta, Ga. J. M. Tull Metal & Supply Co., Inc.
Atlanta, Ga. ... Bowen Refrigeration Supplies, Inc.
Baltimore, Md. ..... Clendenin Bros., Inc.
Baltimore, Md. Melchior, Armstrong, Dessau Co.
Binghamton, N. Y. ... Syracuse Equipment Corp.
Boston, Mass. ..... A E. Borden Co.
Bridgeport, Conn. ..... Parsons Bros.
Brooklyn, N. Y. .....
..... Coleman Electrical Supply Co., Inc.
Brooklyn, N. Y. Melchior, Armstrong, Dessau Co.
Brooklyn, N. Y. ..... The Capson Co.
Buffalo, N. Y. ..... Root, Neal & Co.
Cambridge, Mass. .....
..... Melchior, Armstrong, Dessau Co.
Charlotte, N. C. ..... Henry V. Dick Co.
Chattanooga, Tenn. ..... Noland Co., Inc.
Chicago, Ill. ..... H. W. Blythe Co.
Chicago, Ill. ..... Borg-Warner Service Parts Co.
Chicago, Ill. ..... Fred C. Kramer Co.
Chicago, Ill. ..... H. Channon Co.
Chicago, Ill. .....
..... Automatic Heating & Cooling Supply Co.
Chicago, Ill. ..... The Harry Alter Co., Inc.
Chicago, Ill. ..... Airo Supply Co.
Cincinnati, Ohio ..... The Merkel Bros. Co.
Cincinnati, Ohio ..... Williams & Co., Inc.
Cleveland, Ohio ..... The Harry Alter Co., Inc.
Cleveland, Ohio ..... Williams & Co., Inc.
Columbus, Ohio ..... The Justus & Parker Co.
Dallas, Texas ..... The Electromotive Co.
Davenport, Iowa ..... Republic Electric Co.
Dayton, Ohio ..... The W. H. Kiefaber Co.
Denver, Colo. ..... Auto Equipment Co.
Detroit, Mich. ..... J. M. Oberc, Inc.
Detroit, Mich. ... Borg-Warner Service Parts Co.
Flint, Mich. ..... Shand Radio Specialties
Fort Wayne, Ind. ..... H. J. Schroeder Co.
Ft. Worth, Tex. .....
..... McKinley Refrigeration Supply Co.
Greensboro, N. C. ..... Hasco, Inc.
Harrisburg, Pa. .....
..... Melchior, Armstrong, Dessau Co.
Hartford, Conn. ... Marsden & Wasserman, Inc.
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Jackson, Miss. ..... Enochs Sales Co.
Jacksonville, Fla. ..... Jamita Company
Kansas City, Mo. .....
..... Forslund Pump & Machinery Co.
Knoxville, Tenn. ..... Leinart Engineering Co.
London, Ont., Canada .....
..... Refrigeration Supplies Co., Ltd.
Long Beach, Calif. ..... L. B. Marsh
Los Angeles, Calif. ... Refrigeration Service, Inc.
Los Angeles, Calif. Refrigeration Parts Exchange
Louisville, Ky. .. Louisville Mill Supply Co., Inc.
Lubbock, Tex. R. & R. Parts & Supply Co., Inc.
Macon, Ga. ..... Lowe Electric Co.
Madison, Wis. ..... Gustave A. Larson Co.
Memphis, Tenn. .. United Refrigerator Supply Co.
Miami, Fla. ..... Bailey-Milam, Inc.

Milwaukee, Wis. Chase Brass & Copper Co., Inc.
Milwaukee, Wis. ..... Refrigeration Specialty Co.
Minneapolis, Minn. .....
..... Refrigeration & Industrial Supply Co., Inc.
Minneapolis, Minn. .....
..... Vincent Brass & Copper Co., Inc.
Montreal, Quebec, Canada .....
..... Railway & Engineering Specialties, Ltd.
Mt. Vernon, N. Y. .....
..... County Seat Plumbing Supply Co.
Newark, N. J. ..... T. W. Binder Co.
New Haven, Conn. ..... Rescoe, Inc.
New Orleans, La. ..... Enochs Sales Co.
New Orleans, La. ..... The Spangler Co.
New York, N. Y. ..... Aetna Supply Co.
New York, N. Y. .....
..... Melchior, Armstrong, Dessau Co., Inc.
New York, N.Y. Paramount Electrical Supply Co.
New York, N. Y. ..... The Harry Alter Co., Inc.
Norfolk, Va. ..... Noland Co., Inc.
Oakland, Calif. ..... Pacific Tool & Supply Co.
Oklahoma City Okla. ..... Mideke Supply Co.
Omaha, Nebraska ..... United Supply Co.
Paterson, N. J. ..... White & Shauger, Inc.
Peoria, Ill. ..... Wilkins Pipe & Supply Co.
Pittsburgh, Pa. ..... Williams & Co., Inc.
Philadelphia, Pa. .....
..... Melchior, Armstrong, Dessau Co., Inc.
Philadelphia, Pa. ..... Victor Sales Corporation
Phoenix, Ariz. Refrigeration Supplies Distributor
Portland, Ore. .... Bill Hieber, 526 S. E. Wash.
Providence, R. I. .....
..... Rhode Island Supply & Eng. Co.
Rochester, N. Y. .. Ontario Metal Supply, Inc.
Rochester, N. Y. .....
..... Melchior, Armstrong, Dessau Co., Inc.
Rockford, Ill. ..... Gustave A. Larson Co.
Sacramento, Calif. ..... Hinshaw Supply Co.
Scranton, Pa. ..... Central Service Supply Co.
St. Joseph, Mo. ..... Bristol Supply Co.
St. Louis, Mo. ..... The Harry Alter Co., Inc.
St. Louis, Mo. ..... The Spangler Co.
Salt Lake City, Utah ..... Peerless Utah Co.
San Antonio, Texas ..... Straus-Frank Co.
San Francisco, Calif. California Refrigerator Co.
San Juan, Puerto Rico. Refrigeration Supply Co.
Seattle, Wash. ..... Refrigerative Supply, Inc.
Sioux City, Iowa. National Refrigeration Service
South Bend, Ind. ... The South Bend Supply Co.
South Bend, Ind. ..... F. H. Langsenkamp Co.
Springfield, Ill. ..... United States Electric Co.
Springfield, Mass. ..... C. P. Payson Co.
Syracuse, N. Y. Syracuse Equipment Corporation
Toledo, Ohio. The Heat & Power Engineering Co.
Toronto, Ontario, Canada .....
..... Railway & Engineering Specialties, Ltd.
Tulsa, Okla. ..... Machine Tool & Supply Co.
Vancouver, B. C., Canada ..... Fleck Bros., Ltd.
Washington, D. C. .... Refrigeration Supply Co.
Waterloo, Iowa ..... Winterbottom Supply Co.
White Plains, N. Y. .....
..... County Seat Plumbing Supply Co., Inc.
Wilkes-Barre, Pa. ..... Radio Service Co.
Winnipeg, Manitoba, Canada .....
..... Railway & Engineering Specialties, Ltd.
Worcester, Mass. ..... Standard Supply Co.

### FACTORY REPRESENTATIVES

Chicago, Ill. — Dayton, Ohio — Detroit, Mich. — Los Angeles, Calif. — New York, N. Y. — New Orleans, La. — St. Louis, Mo. — San Francisco, Calif.

### GENERAL EXPORT REPRESENTATIVES

Melchior, Armstrong, Dessau Co., Inc.
300 Fourth Ave., New York City, N. Y., U. S. A.

Such a survey as this is not easy to complete, and without the whole-hearted co-operation of every member in the Society, it can never be accomplished. Therefore, the committee in charge of the work issues a special appeal to all those, in whose hands this questionnaire may fall to follow it through to the best of their ability, and help make the final results of as much value as possible.

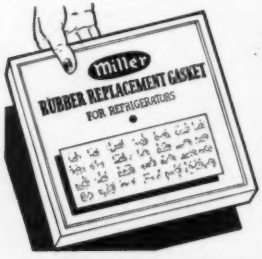
It is not expected that any one man will be able to answer all the questions from actual experience, since there are few men who will experience the installation of all the various kinds or sizes of equipment. Every installation and service engineer however, will, during the course of the summer, be able to answer at least one or two of the questions, and this is exactly what is required. Answer as many as possible from your actual experience of the time required, but do not try to fill out the remaining questions with a guess or estimate of the time. In this way, we hope to secure sufficient authentic answers to complete a very authentic survey, which will be of extreme value to every man in the business.

On pages 42 and 43 is shown the questionnaire form to be used in this survey. These forms are being prepared now in sufficient quantity so that every member of the Society, and many non-members, may be supplied with them. They will be sent to the local chapters throughout the country, for distribution to the individuals. It is hoped that you will not forget them during the rush of the summer's work, and that you will return them to your chapter president when completed.

All non-members, who may be interested in the results of such a survey, are requested to write this publication now for their copy of the form, and urged to participate in the survey.

## YEAR BOOK COMMITTEE ANNOUNCED

PRESIDENT W. HALL MOSS has recently announced the committee which will be in charge of the preparation of the

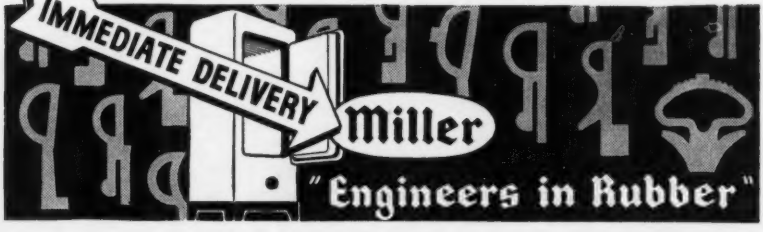

**MILLER DOOR GASKETS**

*Are Boxed Individually for Easy Identification and Storage*

★ Miller makes it easy for you to stock and sell their complete line of rubber replacement door gaskets for refrigerators. Each of their 28 different type gaskets is individually packaged in 10-ft. lengths. Both type number and dimensional drawing of gasket are printed on the box for easy identification. Box protects gasket from light and dirt during storage period and, because of its compact design, requires a minimum of shelf space.

Hundreds of refrigerators in your territory are in need of new door gaskets. Write today for price list and dimensional drawings of the 28 Miller gasket types which enable you to service profitably 80% of all units, regardless of make.

THE MILLER RUBBER COMPANY, INC. • AKRON, OHIO



annual Year Book of the Society, the first edition of which was distributed at the convention in Chicago.

This committee will comprise Mr. W. Hall Moss as chairman, Mr. B. L. Bridges, 941 Madison Avenue, Memphis, Tenn., and Mr. C. A. Brunton, 309 32nd St., Huntington, W. Va. Two additional committee appointments will be made and announced later on.

Suggestions are invited from members as to material that should be included in the second annual Year Book.

* * *

## NATIONAL MEMBERSHIP COMMITTEE STARTS ACTIVE CAMPAIGN

HEADED by the recently appointed national chairman—Mr. E. A. Plesskott, 2145 67th St., St. Louis, Mo.—active plans are under way to increase the membership of the Society through additional members for the chapters now established, the formation of new chapters, and additional members-at-large.

It is the plan of this committee that the chairman of the Membership Committee of each individual chapter will serve as a member of the National Committee and will supervise the work of the National Membership Committee in his own community. It is also expected that the benefit of the various successful plans that have been adopted by the local chapters can in this way be made available for the use of other chapters.

The committee has in mind several plans that will provide an incentive for the individual member to secure new applications and suggests that each member who may have new ideas pass them on to Chairman Plesskott.

## *Chapter Notes*

**Under this heading will appear news of the chapter meetings. For names of the officers and dates of regular meeting nights, please refer to the Chapter Directory.**

### DES MOINES CHAPTER

*February 7*—The organization meeting of this chapter, held at the Dennis Refrigeration Supply Company, was opened by Mr. C. W. Dennis, who introduced Mr. Bob Anderson of the Imperial Brass Mfg. Company, who gave an interesting talk covering new valves and tools introduced recently by Imperial.

"THAT'S *what I call* SERVICE!"

**All the way along the line, the manufacturing and distribution operations behind V-Meth-L and Extra Dry Esotoo are geared to the highest ideals of Service. Exceptional purity of product, combined with swift, dependable delivery from the nearest of our many conveniently located stock branches represents service to you of the greatest importance. In addition, the long-time experience of our Chemical Engineers in the problems of handling liquid refrigerants enables us to advise you on the safest, simplest, quickest methods of dehydrating and transferring. You get better service, and you can *give* better service—with Virginia Smelting products.**

EXTRA DRY ESOTOO

AND

V·METH·L

PRODUCTS OF

VIRGINIA SMELTING CO.

WEST NORFOLK, VA.

Mr. Weigan of the Detroit Lubricator Company gave a few remarks about a new diaphragm type valve.

Mr. S. A. Leitner, National Treasurer, gave a resumé of the aims and purposes of the R.S.E.S., requirements of membership dues, and other information pertaining to the organization of a local chapter. A resolution requesting the organization of a local chapter was read and it was duly moved, seconded and carried that the resolution be accepted.

*February 24*—Held in the same meeting place, the feature of this meeting was a motion picture shown by Mr. C. B. Herbert of Frigidaire, entitled, "Sands on Slippery Sidewalks." A second film—"The Operation of a Thermostatic Expansion Valve"—was also shown.

Mr. McKee of the Detroit Lubricator Co. gave a talk on thermostatic expansion valves and displayed a new style of construction on a valve.

Mr. R. E. Parks of the Mills Novelty Company offered a few suggestions which should be of benefit to the local chapter.

*March 31*—Held in the office of the Percival Manufacturing Co., this meeting was primarily for the purpose of presenting the charter. Election of permanent officers was held, resulting as follows: B. F. Wood, *president;* A. J. Milliron, *vice-president;* E. A. Laverrenz, *secretary;* Dave Gasper, *treasurer;* C. Ray Jones, *sergeant-at-arms;* L. C. Bennett, *Educational chairman.*

It was decided future meetings should be held on the first and third Tuesdays of each month.

Presentation of the charter was made by National Treasurer Leitner, but since all of the charter members were not present it was decided that the President would administer the obligation at a later date.

Refreshments were served after the meeting by the Percival Manufacturing Co.

### PITTSBURGH CHAPTER

*March 11*—Mr. R. L. Stephens of the Detroit Lubricator Co. was the speaker at this meeting and was introduced by Mr. H. S. Stockdale, the local representative of the company. Mr. Stephens lectured on and demonstrated the use and service of thermostatic expansion valves. At the conclusion of the lecture many questions were asked by the members and visitors. President E. V. Black thanked Mr. Stephens and Mr. Stockdale for their part in the program.

FOR COMMERCIAL USE

Mills Compressors

★ Mills Novelty Company
4100 Fullerton Avenue, Chicago, Illinois

SOLD ONLY THROUGH SERVICEMEN, DEALERS, AND DISTRIBUTORS

## DAYTON CHAPTER

*March 30*—The meeting was turned over to Mr. R. W. Cook, sales engineer of Ranco, Inc. Mr. Cook explained in detail the superconstruction incorporated in the building of Ranco controls.

Announcement was made that the April 27th meeting would be held in Piqua, Ohio, and that at the April 13th meeting a representative of the Ansul Chemical Co. would be the speaker of the evening.

## LOS ANGELES CHAPTER

*March 25*—At this meeting—held for the purpose of presenting the charter—a very splendid turnout was had, and an excellent meeting was enjoyed by all.

The charter was presented by Mr. R. L. Darby, member of the National Board of Directors, who executed the most outstanding feat of the evening by presenting the rather lengthy obligation entirely from memory and as it is reported, he did this rather remarkable feat without a hitch or a single mistake.

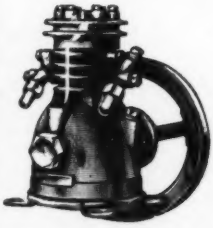
The chapter is off to a flying start and it is predicted that it will really go places in the future.

## LONG BEACH CHAPTER

*March 4th*—As speaker of the evening, we were fortunate in having Mr. Geo. H. Clark, chairman of the Educational Committee of the R.S.E.S., who gave us a very splendid talk and demonstration on expansion valves and their uses, methods of manufacture and servicing. Mr. Clark answered numerous questions put to him from the floor and the members left with the feeling of considerable information gained.

*March 14th*—After calling the meeting to order and the minutes of the previous meeting read and accepted, short talks were made by members regarding the proposed action by the Appliance Dealers Association relative to a new ordinance governing the installation and servicing of mechanical refrigeration equipment. No action was taken. Mr. Darby then read an invitation from the Los Angeles Chapter to attend their meeting on March 25th at which time the charter would be presented.

The meeting was then turned over to Mr. Gunsauls, chairman of the Program Committee, who in turn introduced a representative of the Prest-O-Lite Company as the speaker. Many unique methods of using

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**are designed to give you many years of quiet, efficient and trouble free service by Engineers who have been serving the refrigeration industry for the last fourteen years.**
**They have again "scored a hit" with a new "V" type four cylinder compressor which is designed for use with ½ to 1 HP motors. All of the advanced features that have proven so successful in "Chieftain" household and light commercial units are now incorporated in this new four cylinder model.**
**Mechanical improvements include, force feed lubrication to piston pin and connecting rod bearings, positive alignment of cylinder bores with main bearings by casting cylinders and crankcase in one piece. Adjustable suction shut-off valve, interchangeable parts with single and twin cylinder models. All compressor parts are machined to precision limits on up to date equipment and assembled in glass enclosed rooms where only filtered, dust free air is admitted.**

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**TECUMSEH PRODUCTS CO., Refrigeration Division TECUMSEH, MICH.**

Prest-O-Lite equipment were explained and the information obtained was the subject of considerable comment among the members and visitors present.

*March 28th*—E. T. Hogan, chairman of the Finance Committee, reported regarding the interchange of credit information among members and all members agreed to turn in their lists at the next regular meeting for proper compilation.

The meeting was then turned over to the Educational Committee who had secured the services of Mr. W. C. Smith of the Wagner Electric Corp., who gave a very excellent talk on motors, the procedure of manufacture, purposes of the various types, care and maintenance and general information that was instructive and useful to his listeners. A question box followed, which Mr. Smith handled very creditably.

## WICHITA CHAPTER

*March 23*—The first regular meeting of Wichita Chapter was held in the Kansas Gas and Electric Company's office building. The following officers were elected for the ensuing year: F. W. Ryan, *president;* C. E. Soderberg, *treasurer;* and Frank H. Richards, *secretary.*

Mr. S. A. Leitner, national treasurer of the Society, presented the charter and administered the obligation to the members, following which Mr. Leitner gave an interesting talk on the purposes and aims of the Society. After some discussion, the first and third Fridays of each month were adopted as the regular meeting nights.

Mr. R. W. Cook of Ranco, Inc. gave an educational talk on the subject of controls.

## KANSAS CITY CHAPTER

*March 8*—In keeping with the recently inaugurated policy of the chapter of discussing articles published in our Official Organ, Mr. F. A. Thompson discussed the article, "A New Type Beer Cooler" which was contained in the January issue.

Following this, Mr. L. H. Roberts talked on "Replacement Compressors."

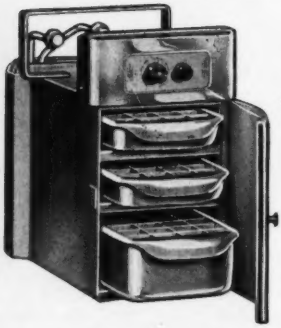
Next, Mr. W. F. Schreiber gave a very interesting discussion on Lectures 3 and 5 of the National Educational Lecture Course. This discussion was so outstanding that a standing vote of thanks was given to Mr. Schreiber and he was immediately elected to carry on with this work at future meetings.

*March 22*—A special meeting to be held on March 28th was announced, at which Mr. George H. Clark—the Chairman of the National Educational and Examining Board—


*Don't Repair Old Worn Out Evaporators—*

*Replace Them With*

**PEERLESS "HUMIDI-PACK"**



Replace old household evaporators with new Peerless "Humidi-Packs"—don't try to repair them.

You'll make more money and have fewer gray hairs!

You'll save money for your customers and give them up-to-date refrigeration!

For information about Peerless "Humidi-Pack" Evaporators see your nearest Peerless jobber or write direct to the nearest Peerless factory.

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would be the guest speaker. The subject of his talk would be "Expansion Valves."

The speaker of the evening—Mr. R. W. Cook of Ranco, Inc.—was introduced and gave a very interesting talk on the products of his company.

### CHICAGO CHAPTER

*March 8*—A letter of proposal from the Medinah Club to hold future meetings of the chapter at this point was read and discussed and finally accepted. Announcement was made that future meetings would be held in rooms of this building.

On the educational program, several visitors were introduced, each of whom spoke briefly on subjects familiar to them. Among these were Mr. H. E. Welsch of the Belmont Dairy Company, Mr. Don Fleak and Mr. R. B. Higby of New York city, and Mr. Hans Jensen of the Rotary Seal Company. Mr. Jensen discussed Rotary seals and answered questions to some length, to the enjoyment of those present.

*March 22*—Mr. Vanston introduced on the educational program Mr. D. G. Tmey and Mr. A. F. Carroll of the Automatic Products Co. Mr. Carroll gave a very interesting talk on A-P automatic expansion valves, illustrating his talk with diagrams and sketches of the operation of the different valves in general.

Refreshments were served following the meeting and many of the members adjourned to the bowling alleys of the club for a display of their skill in this art.

### DAYTON CHAPTER

*March 2*—For the purpose of stimulating interest at surrounding points it was decided to hold meetings in surrounding towns such as Springfield and Piqua once or twice a year.

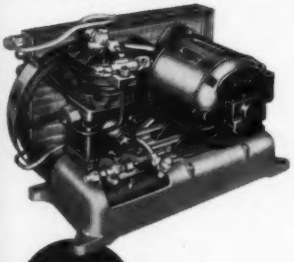
Mr. H. Shoupp, chairman of the Educational Committee, outlined a program of educational features which he is planning on launching.

*March 16*—After a short business session the meeting was turned over to Mr. H. Shoupp, chairman of the Educational Committee, who spoke at length on the subject of, "Selling Service," which proved very interesting to the assembly.

### TRI-STATE CHAPTER

*March 7*—Mr. Jack E. Dannels, manager of the Cincinnati branch of the Fedders Manufacturing Company, was introduced on the educational program, and gave an interesting lecture on valves for every purpose and


for Service Replacement & New Installations



M & E Bare Compressors and complete units, available with or without motors and controls, meet every need of the Assembler or Service Company with high quality, moderately priced.

One, two and four cylinder models for $SO_2$, $CH_3CL$ and F-12. 1/6 h.p. to 20 h.p.

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commercial lowsides. To close the lecture, Mr. Dannels invited questions and promoted a general discussion on the subject. Copies of Refrigeration Engineering and Service Articles by Mr. Joe Askin were distributed as a souvenir to each of the members.

President C. A. Brunton announced a special meeting to be held on March 16th for the purpose of hearing Mr. Stephens of the Detroit Lubricator Company speak on their products.

*March 16*—This special meeting, held for the purpose of hearing Mr. R. L. Stephens of the Detroit Lubricator Company, was very much enjoyed by the entire assembly. The subject of his talk was a lecture on expansion valves.

Mr. H. S. Stockdale followed with a short talk on solenoid valves as manufactured by the Detroit Lubricator Company. Catalogs and educational literature were distributed to those present.

*March 21*—Mr. Kemp of the Kerotest Mfg. Company was the speaker of the evening on the subject of Kerotest valves and fittings.

Mr. Forrest D. Poole, as host of the evening, gave a short talk on problems confronting the service engineer and the aims of the Society in helping to eliminate these problems. Considerable time was devoted to explaining the objects and benefits of the Society for the benefit of those visitors present. Another special meeting to be held on March 23rd at the Mechanical Refrigeration Supply Company was announced by President Brunton.

## ST. LOUIS CHAPTER

*February 24*—For the benefit of the many guests present, Mr. Vollman spent considerable time explaining the purposes of the Society.

On the educational program, Mr. E. Gygax, chairman of the Educational Committee, introduced Mr. H. L. Dahm, president of the G. S. Robbins Company, local distributor for "Artic" methyl chloride. Mr. Dahm, in turn introduced Mr. E. W. McGovern of the R. & H. Chemicals Department. Mr. McGovern gave a very interesting talk on "Methyl Chloride—A Practical Refrigerant Measured by the Theoretical Ideal." Copies of this talk may be obtained from the R. & H. Chemicals Department at Wilmington, Delaware.

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## MADISON CHAPTER

*March 1*—Mr. R. O. Johnson of the U. of W. Electrical Standards Laboratory was introduced on the educational program and presented slides showing the different tests made in his laboratories. The tests made were on such appliances as electric irons, ground cables used by utilities in repairing lines, washing machines, household refrigerators and electric fences. The slides also included graphs showing comparative values of the devices tested. Numbers were assigned to each of the units and names were omitted, so that the makers of these machines were not known.

*March 15*—Mr. H. A. Struthers was elected chairman of the new Code Committee, and was premitted the privilege of appointing his committee members. Mr. Gus Larson, chairman of the Educational Committee, introduced Mr. Banks and Mr. Gates of the Minneapolis-Honeywell Regulator Company. Mr. Banks, with the aid of display boards and catalogs which were distributed, gave a thorough demonstration of what his company has done toward making refrigeration fully automatic.

Numerous questions were asked of Mr. Banks concerning his products and were thoroughly answered in a very satisfactory manner.

Mr. Banks then generously ordered all of the beer the boys wanted and in addition distributed cigars to all.

## MISSISSIPPI VALLEY CHAPTER

*March 11*—Announcement was made of a stag which would follow the next regular business session of March 25th. Mr. D. S. Brainard, Bill Cawiezell and Cy Kaufman are to serve on a committee making the plans and members are to be assessed seventy-five cents each.

Mr. G. W. Gauger was the educational speaker of the evening, and gave a talk on the products of the Commercial Coil and Refrigeration Co. Most interesting of the points brought out by him was the new two-temperature valve which was given its initial showing at this meeting.

## CAPITAL CITY CHAPTER

*February 16*—140 members and visitors were present at this meeting, and due to this fact President N. Matheson devoted considerable time to explaining the objects of the Society

WE are ready for the Spring rush. Prompt shipments are assured by our large stocks. Look over our latest catalog which shows new items and new low prices. All parts, supplies, tools and equipment for refrigeration and air conditioning.

**THE HARRY ALTER CO.**

**1728 So. Michigan Avenue, Chicago, Ill.**

and the benefits of membership therein. Mr. N. E. Burdette was introduced as toastmaster, and he in turn introduced Mr. Suther of the Mueller Brass Company of Port Huron, Michigan. Mr. Suther, after a few remarks, presented Mr. P. O. Domke—also of the Mueller Brass Co.—the speaker of the evening.

The subject of the evening was on the many products of the Mueller Brass Company, which found a very attentive ear from the audience.

Following the meeting a plate lunch and refreshments were served.

### ST. JOSEPH CHAPTER

*February 23*—Members and many visitors from such points as Kansas City Chapter, St. Joseph Railway, Light and Power Co., and many other scattered points swelled this meeting to one of unusual size.

Mr. H. O. Bruess of the Bristol Supply Company, chairman of the Entertainment Committee, spoke shortly on the subject of cooperation between the various branches of the industry.

Mr. S. A. Leitner of Kansas City Chapter spoke at length on the importance of membership in the R.S.E.S.

Mr. McKee of the Detroit Lubricator Company was introduced on the educational program and gave an interesting talk on "Expansion Valves, and That Little Bit of Difference" and how to adjust and test expansion valves.

A Dutch lunch was served and while the munching was going on Mr. McKee answered many questions concerning his products.

The St. Joseph Chapter extends their thanks to the Detroit Lubricator Company, the Bristol Supply Company and Kansas City Chapter for their cooperation in making this meeting such a success.

### ROCKFORD CHAPTER

*February 21*—Considerable discussion took place on the steps that should be taken to standardize prices on refrigerants and repair parts. Due to the lengthiness of the discussion, however, no solution was arrived at and the matter was tabled until a future meeting.

Mr. Reichow of the Minneapolis-Honeywell Regulator Co. gave an interesting talk on controls manufactured by his company.

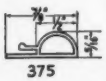
Refreshments were served following the meeting.

*March 21*—President R. C. McCarthy suggested a plan to publicize the work of the chapter and the Society by means of envelope stuffers, to be sent out with invoices and form letters.

A report of a special committee for the purpose of formulating a set of by-laws for a proposed Illinois State Chapter followed.

The meeting was then turned over to Mr. McKee and Mr. Page of the Detroit Lubricator Company. They gave a very interesting and very instructive demonstration on the operation and testing of expansion valves in general and Detroit valves in particular.


**Jarrow Replacement Door Gaskets**



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● The gasket illustrated was made especially for APEX and CROSLEY replacement. It fits. All JARROW gaskets are built to manufacturers specifications. Insist on JARROW gaskets.

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**REPLACEMENT GASKETS FOR ALL MAKES**

Metallic Gaskets that hold regardless of what the refrigerant may be and will not shed particles of material to clog up important working parts in a machine.

*Send for catalog listing many "orphans" not available elsewhere.*

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## MISSOURI VALLEY CHAPTER

*March 3*—Mr. V. E. Kauffman of the Educational Committee read a part of the Lecture Course lesson on constant pressure valves. Messrs. G. L. Eacker, C. O. Douglass and J. M. Hart also read parts of this lesson. Following this, the members discussed the use and advantages of different makes of constant pressure valves.

It was suggested that the chapter have a group picture taken at the following meeting by a professional photographer, to be paid for out of the treasury.

## MISSISSIPPI VALLEY CHAPTER

*March 25*—Due to the fact that a stag had been planned for this meeting a very brief business session was held. Mr. Leonard Nelson spoke to the members regarding the new Illinois State Chapter being formed.

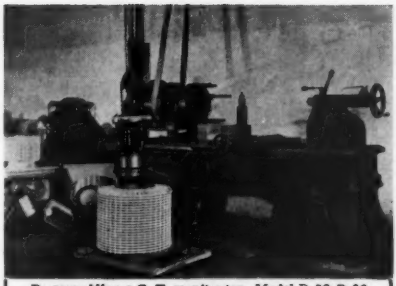
The educational speaker of the evening, Mr. Lester of the Automatic Products Company was introduced following which he gave an interesting talk on valves. The members of the Chapter were very fortunate in having Mr. Lester with them at this meeting and are looking forward to the time when he can be with them again to give more information on valves.

S S S

## THE "CONTRIBS' COLYUM"

By THE KINGFISH

THE Marshalltown Siamese Test Gauge which was on display at the Republic Electric Company received a lot of attention at the last meeting of the Mississippi Valley Chapter on March 11th. It seems that someone was wondering if they could play a joke on Eph Bengston and kidnap this gauge without his knowing it. This would be a very difficult undertaking as Eph keeps an eagle eye on those parts of his. But, lo and

*Re-assembling a G. E. monitor top, Model D-50-B-26 (Commercial Unit) in our shop*

**Refrigerator Dealers and Service Men**

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Complete Rebuilding and Repairs on All Models
Specializing on Westinghouse, G. E. Monitor Tops and Majestics
Complete Machine Shop Service
Write for Prices—Specify Makes and Models

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HERMETIC ENGINEERS
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**Our New 1938**

catalog is now at press—showing the latest refrigeration supplies and prices. You can't afford to miss it. Write on your letterhead.

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**COLD CONTROLS & EXPANSION VALVES**
**repaired or exchanged**
at the following prices, F.O.B. Chicago

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| Automatic Expansion Valves (All Makes) | $1.25 |
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ALL WORK GUARANTEED FOR 90 DAYS

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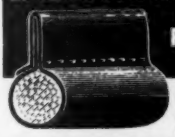
**FOR ALL MAKES REFRIGERATOR DOORS**



A complete line of rubber - coated, packed Gaskets and extruded rubber Gaskets that last longer—retain higher efficiency—because made of finest materials and workmanship. Write for free samples, giving your jobber's name and address.

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behold, a few days following the meeting Mr. Bengston received a small package in the mail and when he opened it he found to his great surprise and chagrin that someone had put it over on him. There was his gauge —gone for about four days—and he did not realize it until it was back in his hands again. His mind is pretty well made up as to the culprit who was behind this joke and is wondering if he should have some house detective around to take these boys in hand like the house detectives at the Chicago Convention took them in when they were picking those bootiful posies.

---

We have a tip that the Ladies Auxiliary of the Mississippi Valley Chapter is planning on having a party for the members of the Mississippi Valley Chapter in the very near future. These same ladies have already mentioned that they are all going to the National Convention which is to be held in Buffalo on November 2, 3 and 4, so we are hoping that the Mississippi Valley Chapter will be well represented.

---

We won't mention any names but it seems that the Liberty Theatre in Davenport had quite an attraction for some of the members of the R.S.E.S. after the meeting on February 25th. Wonder why?

---

The Mississippi Valley Chapter was honored by having their President, Leonard C. Nelson, elected Temporary Chairman of the new Illinois State Chapter.



## MEMPHIS LADIES AUXILIARY

STARTING a new year with only one change in our staff of officers, that being the Secretary, our social meetings are still going strong with luncheons in the homes of Mrs. Bland Bridges, Mrs. Boyd Evans and Mrs. Carl Brakefield.

Warm weather and the call of the great outdoors, resulted in plans for a picnic at Overton Park along with the business meeting in April.

"The way to a man's heart is through his stomach," was proven by actions instead of words at the hamburger supper which was served cafeteria style. We found that we had a good many "Wimpys" in the crowd and before morning most of us were wishing we had practiced a little more resistance. —*Mrs. Bill Thompson.*



## PICTURED ON OPPOSITE PAGE

THIRD ANNUAL BANQUET, KANSAS CITY CHAPTER. On February 24th, the Kansas City Chapter dinner dance was held at the "Hawthorne," which is noted for its fine dinners and hospitality. Some fifty-five couples took advantage of this annual affair, which always provides an evening of real fun and entertainment.

Chicken, of course, was the feature of the spread. Music by a good orchestra, singing, and a very genial host supplied the entertainment.

The subject of conversation for many an evening will be the enormous capacity of Mr. Soderberg for fried chicken, who, with his better half, came over two hundred and fifty miles from Wichita to attend. He has been dubbed the champion chicken eater of Missouri and Kansas.

This view of the attendance is proof of the success of the affair.


**Domestic Controls Repaired**

Ranco pencil types $1.75. General Electric, Cutler-Hammer, Tag, Penn, Ranco box types $2.00. Bishop Babcock, Majestic, Penn magnetic types $2.50. All calibrated to factory specifications. We pay return postage.

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*Many new items for air conditioning and refrigeration . . complete stock . . new low prices.*

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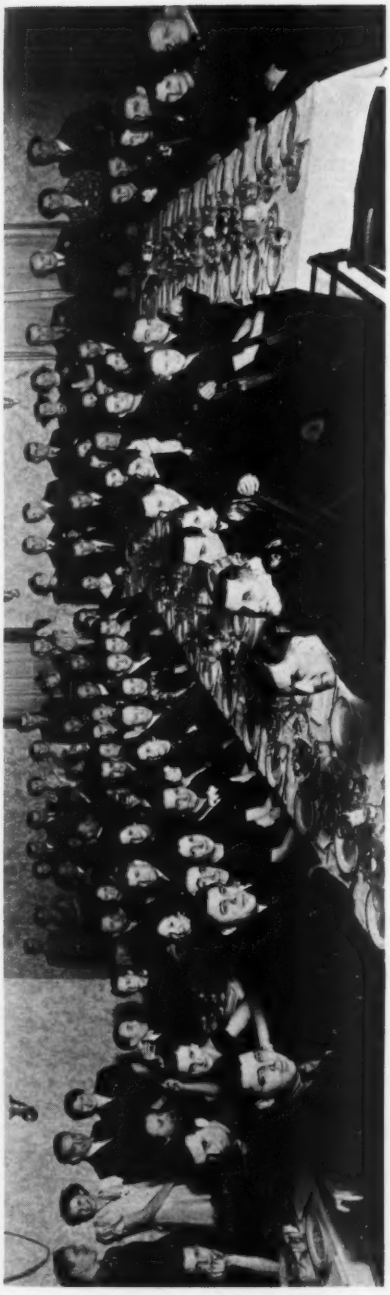
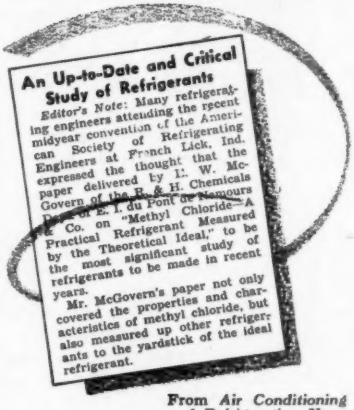


# "THE MOST SIGNIFICANT STUDY OF REFRIGERANTS MADE IN RECENT YEARS"



**An Up-to-Date and Critical Study of Refrigerants**

*Editor's Note:* Many refrigerating engineers attending the recent midyear convention of the American Society of Refrigerating Engineers at French Lick, Ind. expressed the thought that the paper delivered by E. W. McGovern of the R. & H. Chemicals Dept. of E. I. du Pont de Nemours & Co. on "Methyl Chloride—A Practical Refrigerant Measured by the Theoretical Ideal," to be the most significant study of refrigerants to be made in recent years.

Mr. McGovern's paper not only covered the properties and characteristics of methyl chloride, but also measured up other refrigerants to the yardstick of the ideal refrigerant.

From *Air Conditioning and Refrigeration News*

JUST what is an ideal refrigerant? What are its properties? How do the refrigerants now available measure up to the ideal refrigerant in properties and performance? All of this, and more useful information for the machine designer, manufacturer and service engineer is given in the important study just made by Mr. E. W. McGovern.

This convenient booklet will be sent to you free. Use the coupon below.

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**(DU PONT METHYL CHLORIDE)**

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**E. I. du Pont de Nemours & Co., Inc.**
**The R. & H. Chem. Dept., Wilmington, Del.**

Please send me a copy of "Methyl Chloride, a Practical Refrigerant Measured by the Theoretical Ideal."

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**ACTION-AIR SYSTEM**


## NEW CATALOGS AND BULLETINS

ALCO VALVE COMPANY—Manual and catalog of refrigerant controls. Contains unusual amount of helpful information. 75 pages in loose-leaf binder, conveniently indexed. As changes in equipment are made, additions or replacements for the catalog will be mailed out.

Several pages of application information will be found very interesting to the service engineer. Write the manufacturer, at 2628 Big Bend Blvd., St. Louis, Mo., for your copy.

---

H. W. BLYTHE COMPANY announce that their new Catalog No. 38 covering refrigeration and air-conditioning parts and supplies is now being mailed to dealers and service companies. This catalog has been greatly enlarged to cover the many new items that are of interest to the refrigeration and air conditioning industry.

A very complete listing of products supplied by manufacturers whose names represent quality in this field will give you much valuable information. Adequate stocks are available for prompt service to the trade.

List prices are shown in all cases, and a simple method of determining the wholesale cost is used. This system prevents the exposure of the service company's cost to their consumer customers.

Any requests for this very complete catalog sent to H. W. Blythe Co., 2334 S. Michigan Ave., Chicago, accompanied by your business card or letterhead will be taken care of promptly.

REPUBLIC ELECTRIC COMPANY, wholesale refrigeration supply jobbers of western Illinois and eastern Iowa have issued their new 100-page refrigeration supply catalog No. 38 for dealers and servicemen in this territory.

## REPUBLIC ELECTRIC CO. ANNUAL CONVENTION

THE Republic Electric Company, wholesale refrigeration supply jobbers of eastern Iowa and western Illinois, had their first annual convention at the Blackhawk Hotel in Davenport, Iowa, with a representative group of dealers and servicemen in attendance.

NEW FAST DIRECT COOLING

**COLTROL D-X**

**LIQUID COOLER**

*Also supplied in complete package unit, ready to plug in. See description page 14, January, 1938.*

In the new COLTROL D-X the refrigerant contacts the coils directly—the fastest method of cooling, with the least temperature lag—Simple to install, easy to service. No moving parts.

**COMMERCIAL COIL & REFRIGERATION CO.**
**459 North Artesian Avenue, Chicago, Illinois**

**. . SEE YOUR JOBBER OR WRITE DIRECT . .**

for air as cold as

There's a REMPE Unit cooler for every purpose, every refrigerant, every temperature. 216 varieties of sizes and coils. Temperatures even *lower* than 11° on special orders. And they offer the kind of efficiency that always spells complete SATISFACTION.

11° *and even colder!*

REMPE CO., 340 N. Sacramento Blvd., CHICAGO

The meeting began at 10:00 A. M. and extended throughout the day and evening. The following manufacturers had displays and their representatives gave interesting talks on their 1938 line of products.

Chicago Metal Hose Company
Marshalltown Mfg. Company
Wagner Electric Corporation
Henry Valve Company
Ansul Chemical Company
Rotary Seal Company
Dayton Rubber Mfg. Company
Minneapolis-Honeywell Reg. Co.
Fedders Manufacturing Co., Inc.
Penn Electric Switch Company
Kerotest Mfg. Company
Automatic Products Company
Refrigeration Service Engrs. Society
Ranco Incorporated
American Injector Company
Perfection Refn. Parts Co.
United Wire & Supply Corp.
The Texas Company
Imperial Brass Mfg. Co.
Modern Equipment Company
Detroit Lubricator Co.
Peerless of America, Inc.
Copeland Refn. Corp.
Commercial Coil & Refn. Co.
Julien P. Friez & Sons, Inc.

All of the dealers and servicemen present appreciated the displays of the manufacturers on their new line of refrigeration supplies and enjoyed the interesting and educational talks given by the agents of these manufacturers.

## KEROTEST APPOINTS NEW SOUTHERN REPRESENTATIVE

ANNOUNCEMENT was made recently of the appointment of Mr. H. E. Ferrill as representative for the Kerotest Brass Division in the southern states, including: South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, and the southern parts of Oklahoma and Arkansas.

Mr. Ferrill is a graduate of the U. S. Naval Academy, where he majored in engineering. For the past six years, he has been employed by the Philadelphia Kelvinator Service Corp., and the Raymond Rosen Company, Philadelphia distributor for Kelvinator. The engineering experience gained

PARTS-SUPPLIES-TOOLS
for REFRIGERATION-AIR CONDITIONING

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*Now Available With*
**SWEAT-TYPE CONNECTIONS**

**The General Controls current-failure, pilot-operated Magnetic Refrigerant Valves (Series K-15) and Strainers (S-5) are now furnished with sweat-type connections or with standard threaded fittings. A positive action stop-valve combination that is readily installed on air conditioning or refrigeration equipment. Send for new 1938 catalog.**

QUIET SOLENOID
TIGHT CLOSING
PILOT-OPERATED
FULL PORTED
FULLY POWERED
PACKLESS DESIGN
QUICKLY INSTALLED

**GENERAL CONTROLS**
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CHICAGO

H. E. FERRILL

during these years well fits him for his new position.

Mr. Ferrill will devote his entire time to Kerotest Brass Division sales and service problems, and will not carry or be involved with any other line. Having spent the last six months in the Kerotest engineering, production and sales departments, he assumes his new duties thoroughly grounded in their products and sales policies.

* * *

## WESTINGHOUSE COMMERCIAL SALES DEPARTMENT APPROVES PEERLESS COILS

M. W. KNIGHT, general sales manager of Peerless of America, Inc., Chicago, Ill., announces a line of Peerless commercial lowsides that have been given approval by the Commercial Refrigeration Sales Department of Westinghouse Electric & Manufacturing Company, Mansfield, Ohio, for use with the Westinghouse line of commercial condensing units. This arrangement is effective immediately, and all coils approved by Westinghouse will carry special nameplates with the designation—"This coil manufactured to Westinghouse warranty specifications."

In addition to a full line of "Rifled" fin coils, Peerless also manufactures and distributes for dealers' and distributors' use, other lowsides comprising bare pipe coils, "Off-Center" coils, unit coolers, including floor type models, ice cube makers, valves, Water Savers (evaporative condensers), banana room coolers, and Synchro-Fan controls for unit coolers.

Approval of the Peerless line came as a result of tests made during the past year by

Westinghouse engineers. Special data on Westinghouse approved coils, including prices, specifications and engineering information has been compiled and is now available to Westinghouse dealers and distributors upon request to Peerless of America, Inc., Chicago, Ill.

S S S

## H. O. REAMS AND R. H. GLEZEN JOIN KOLD-HOLD FIELD-ENGINEERING STAFF

THE Kold-Hold Manufacturing Company of Lansing, Mich. announce that they have secured the services of Mr. H. O. Reams and Mr. R. H. Glezen, two widely experienced men who will contact the trade in the interest of the company's truck cooling units, ice cream cabinet conversion units and plates for other application.

Mr. Reams' experience in the electrical and mechanical refrigeration fields covers a long period of time in which he has served as engineer, service director and sales promotion manager. Mr. Reams was identified with the electrical refrigeration game first as southwest division manager and later as the organizer and director of service for the Servel Corp.

Leaving Servel, Mr. Reams spent the next two years in general commercial refrigeration work in Roanoke, Va., which he relinquished to devote his time to the development of truck refrigeration for the Spangler Company of St. Louis and Forslund Pump and Machinery Company of Kansas City.

Mr. Glezen, or "Bus" as he is more familiarly known to his host of business friends, is a tiny individual of 202 pounds and six feet-two in the perpendicular. He talks business, sticks to business and does business. Just turned 33, he has nevertheless, thoroughly proven his ability as a business executive by climbing from salesman to sales manager and then general manager of a large industrial supply concern.

S S S

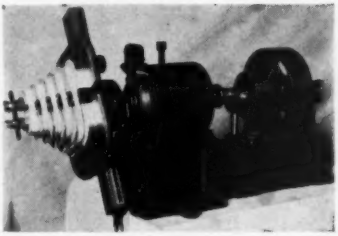
## Classified Ads

**Rate: One Dollar for thirty words or less. 20 cents for each additional ten words or less.**

FOR SALE—Refrigeration service and air conditioning business. Well established. City of 11,000. Net invoice $3500.00. Good yearly income. Dun and Bradstreet rating. Address Box 113, THE REFRIGERATION SERVICE ENGINEER, 435 N. Waller Ave., Chicago, Ill.


**WINDS SUPERIOR REFRIGERATOR MOTOR COILS**

**IDEAL COIL WINDER**



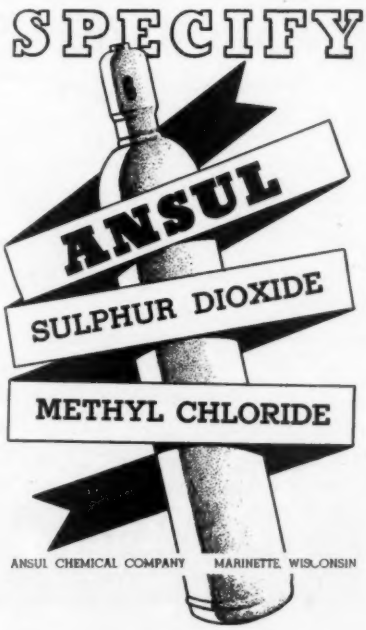
Winds quality coils faster and more economically. Positive brake control maintains true tension and assures uniform coils.

Eliminates use of many jigs—simple speed-adjuster. When finished coils are ready for insertion into motor—only two wire ends to solder.

Write for complete information.

**Ideal Commutator Dresser Company**
1093 Park Avenue Sycamore, Illinois





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"I WON'T BUY A GAUGE WITHOUT THE RECALIBRATOR!"

That has been the attitude of many service men since the RECALIBRATOR feature was incorporated in Marsh Gauges, Thermometers and Recorders. Experience and laboratory tests have shown that when a bourdon-tube instrument is knocked out of adjustment the mere removing and re-setting of the pointer at one point on the scale, does not correct it throughout the entire range. The Marsh RECALIBRATOR gets at the heart of the trouble, however. By simply turning the RECALIBRATOR screw (see illustration) the **distortion of the bourdon tube is compensated for** and this **re-calibrates the instrument throughout its entire range.**

Gauges and dial thermometers with this feature cost little more than the ordinary kind. It is an exclusive Marsh feature.

Ask for the big refrigeration catalog covering this and other Marsh betterments.

Compound Gauge

High Pressure Gauge

**JAS. P. MARSH CORPORATION**

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**MARSH** *Refrigeration Instruments*

GAUGES—THERMOMETERS—RECORDERS—MERCURY SWITCHES

# PENN ENGINEERS LOOK AT NOISE

## WE COULD MEASURE THE TREAD OF A CAT WALKING ON COTTON

Noises in control equipment bring complaints . . . dissatisfaction . . . service expense. Penn is doing something about it! We *measure* noise! We *locate* its source! Then, we *eliminate* it!

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Design problems peculiar to every class of controls are solved with this same thoroughness by Penn engineers. You, too, can have the benefit of such engineering when you specify Penn controls.

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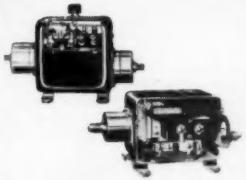
**GOSHEN, INDIANA**

***Branches:*** New York, Boston, Philadelphia, Dayton, Detroit, Chicago, Moline. ***Special Representatives:*** Garland-Affolter Engineering Corp., San Francisco, Los Angeles, Seattle, Portland; Monarch Sales, Denver; Forslund Pump and Machinery Co., Kansas City; Jules Beneke, St. Louis; The Uhl Co., Minneapolis. Distributors in all principal cities.



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The surest way to protect customer satisfaction and profits is to use replacement parts made by the manufacturer of the original equipment. Only UNIVERSAL COOLER has the experience and facilities to build dependable UNIVERSAL COOLER parts incorporating the latest improvements and developments.

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| Newark, N. J. | T. W. Binder Company |
| New Orleans, La. | Enoch Sales Company |
| Omaha, Nebr. | United Supply Company |
| Philadelphia, Pa. | Victor Sales Corp. |
| Richmond, Va. | Refrigeration Supply Co. |
| San Francisco, Cal. | Cyclops Iron Works |
| St. Louis, Mo. | Brass & Copper Sales Co. |
| St. Paul, Minn. | Thermal Company, Inc. |
| Syracuse, N. Y. | Syracuse Equipment Co. |
| Washington, D. C. | Refrigeration Supply Co. |

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DETROIT • MICHIGAN

# "WHAZZAT?"

says Joe, pretending not to hear good. Joe used to choke on Ammonia and gag on $SO_2$ and Methyl Chloride, but not any more. He got himself a

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## FUME KIT

In days gone by when he was 'hard-boiled' he disliked the mask idea, but one day, just for a 'kid' he tried on a Healthguard. Since he found out how light and comfortable and easy to breathe through it is, he's altered his logic. He slips it on in a jiffy; it fits like a glove; he does a first-class job, he's through sooner, and his throat and lungs are fresh as a daisy—no smart, no sneeze, no tight feeling, no cough. It is easy to carry, it's rugged, and the cost was small. So Joe doesn't 'loan' his helper, he 'sells' him. Kit comes equipped with cartridges for Ammonia, Methyl Chloride, Sulphur Dioxide. Write for details.

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**2341 Warren Boulevard CHICAGO, ILL.**

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*Refrigeration and Air Conditioning*

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NEWARK, N. J.

*Member of National Refrigeration Jobbers Association*

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MILWAUKEE, WISC.

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Yours truly,

T. W. Binder Co.

Thomas W. Binder

# "OUR TRADE *Demanded* (AP) CONTROLS"

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Interior of T. W. Binder Company's modern well-stocked supply store.

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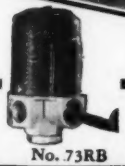
**PROGRESSIVE JOBBERS EVERYWHERE STOCK A-P CONTROLS**



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Illustrated are the two most popular types. They will meet practically all requirements for tools of this kind.

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The full line of Bonney Tools for Refrigeration Service is illustrated in Catalog No. 38R. You need this book of "The Finest That Money Can Buy". Write for your copy today.

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Stocked by Leading Jobbers Everywhere

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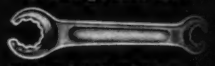

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